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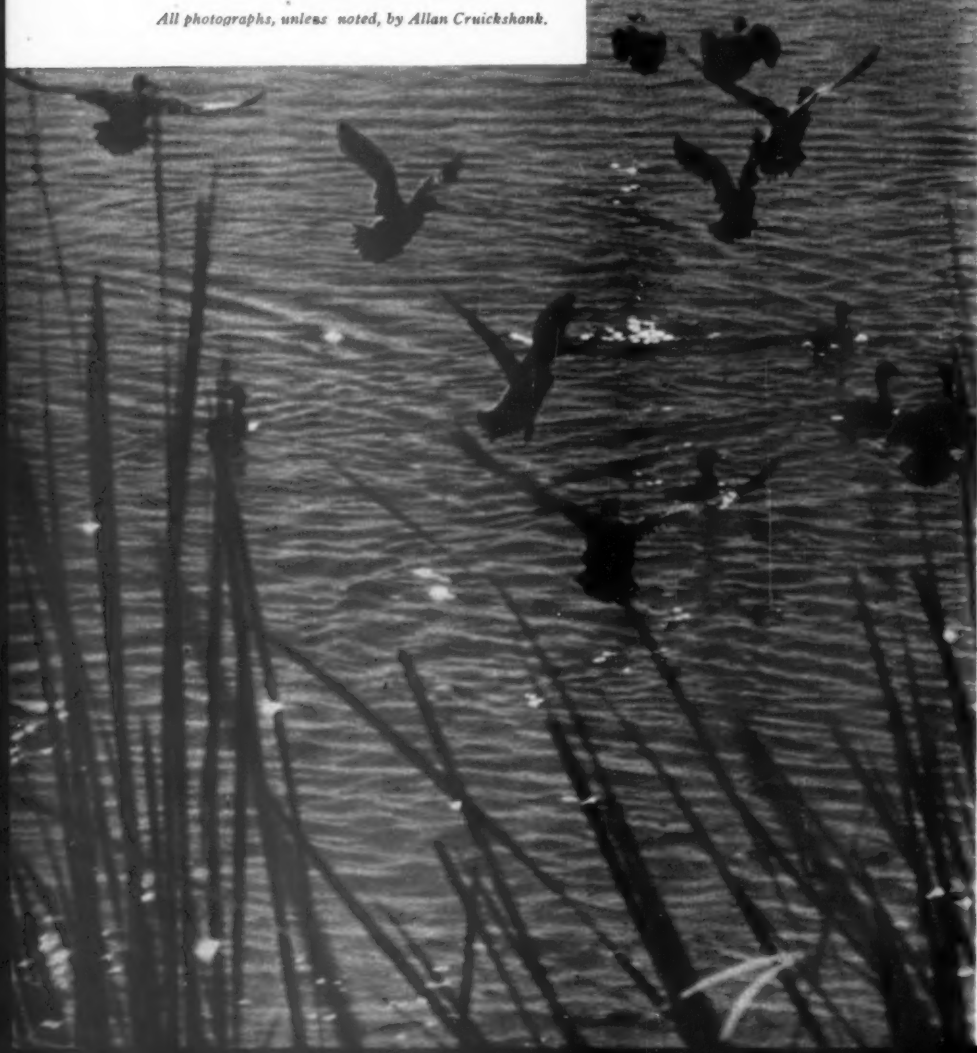
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Wings flash and water ripples as the ducks show off for the camera. Many species of duck and other waterfowl are at home on Bull's Island, finding their food in the marshes and the fresh water ponds.

All photographs, unless noted, by Allan Cruickshank.



BULL'S ISLAND

A REFUGE WHITHER
BIRDS AND NATUREMEN
FLOCK IN WINTER

— By Maurice Brooks

BLACKBEARD, the pirate, may well have buried a portion of his booty on Bull's Island—in any event bird students have been turning up ornithological treasure as they visit the island and its environs.

The Cape Romain National Wildlife Refuge, of which Bull's Island is a part, is a vast preserve along the Atlantic coast just north of Charleston, South Carolina. It is maintained by the Fish and Wildlife Service of the U. S. Department of the Interior. Within its 60,000 acres are brackish marshes, shallow tidal flats, innumerable salt water creeks and, protecting the hinterland, a chain of barrier islands. Bull's Island is the jewel in this chain, since its 5000 acres are largely in dense sub-tropical woodland and coastal jungle. Toward the sea are low sand dunes for variety, but the forests of live oak, magnolia, pine and palmetto are dominant, and give the area its character.

On the mainland of South Carolina palmetto forests have largely disappeared, and the venerable live oaks, festooned with Spanish moss, are preserved chiefly along the driveways leading to some private estate. If one would see the Palmetto State as it was in the days of Charles the First, he must seek



Photograph by Wm. Baldwin

the coastal islands. It is this pristine character, this seeming turning back of time for three centuries, which gives Bull's Island its most obvious charm. There is nothing in the approach which prepares the visitor for such lush, junglelike profusion, totally unlike the open pine forests of the adjacent mainland. Other things of interest and beauty are there, and in profusion, but first of all there is the forest.

Visitors from the North are likely to come to Cape Romain Refuge by way of the Ocean Highway, and the meeting of land and salt water will become manifest in a thousand inlets, tidal rivers, sand beaches and brackish marshes. In the pine woods, where long-



leaf and loblolly raise their straight, branch-free trunks, one looks for brown-headed nuthatches, red-cockaded woodpeckers and white-eyed towhees. Wintering warblers—pine, myrtle, yellow palm and sometimes orange-crowned—are often surprisingly abundant. There is a wealth of sparrows, and near the shores one finds fish crow and boat-tailed grackles.

The Santee delta, famed for its hordes of wintering waterfowl, lies adjacent to Cape Romain, and as one crosses the river he is pretty certain to see egrets standing atop the tall cypresses. Despite the somber hues of the season, this is a living landscape, particularly welcome to northern eyes which search the fields and woodlands at home for the few scattered winter birds.

Herbert Ravenel Sass once wrote a splendid essay on the Carolina coastal country which he called "Great Soaring Birds." That the title is an apt one becomes evident on the boat trip from the mainland to Bull's Island. Soaring birds, and great ones too, are everywhere. The vultures, turkeys and blacks, are as one expects them, but the number of bald eagles, hawks and occasional ospreys comes as a pleasant surprise. The eagles course above the tidal creeks, or alight on the channel markers, displacing the gulls and cormorants which also favor these perches.

Nature achieves some of her most striking effects with chastely contrasting black and white—as becomes apparent

when one nears Bull's Island. Abundant on the beaches are the oyster-catchers, their shining black and white bodies and their great red bills making a color combination to delight the eye. Willets, sand-tone birds until they unfold their black and white wings, tell their name on every beach, and one never tires of watching them as they alight, raise their wings in one last flash of color, and then merge into the complementary background of the sand. Black-necked stilts, here at their northern breeding limits on the Atlantic Coast, may occasionally be found, and later in the year other black and white birds, notably the black skimmers, will abound.

Near the island landing is a group of buildings which house the maintenance personnel of this portion of the refuge. These structures are set in a grove of huge live oak trees, upon which the gray polypody fern is growing. There is a chance of finding the elusive little ground doves about the clearing, since these birds seem most at home near man and the developments for which he is responsible.

A woodland road circles the island not far back from the beaches, and this is likely to be the mecca for nature people who desire to know the area more intimately. One plunges immediately into a jungle of prickly-leaved holly, overtopped by loblolly pines, shining-leaved magnolias, red bays and, everywhere, the palmettos, often in nearly pure stands thirty feet or more in height.



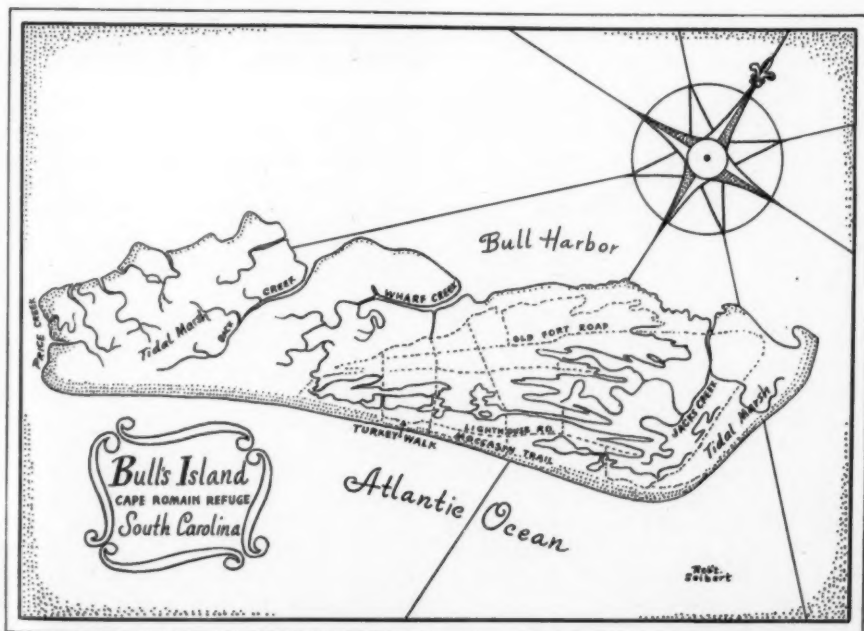
Laughing gulls parade in formation at the edge of the tide on the sandy Bull's Island beach.

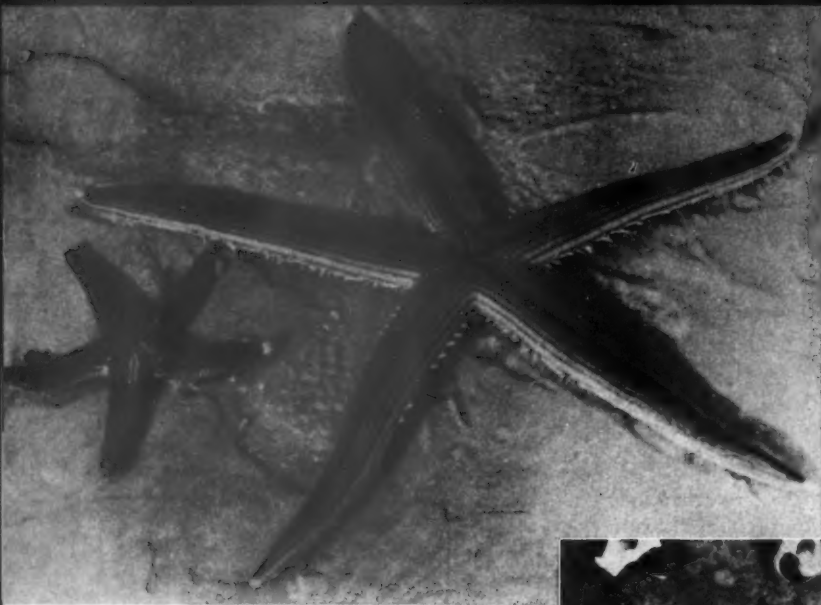
Only the road suggests humankind, but without it few would travel far into the stubborn holly tangles.

Every bend in the road holds promise. Around it you may see a wild turkey, present in good numbers on the island. White-tailed deer, of a race peculiar to Bull's Island, may be feeding at the forest margins. Under the banks of black-water tarns are the burrows of alligators, and one may be surprised on the banks,

or may be spotted as it floats motionless on the pool's surface. These same tarns shelter a good population of Carolina otters, mammals which have long since disappeared from most mainland regions. Small birds abound, but unless they are singing they are likely to go unidentified. Since only a little light penetrates the forest crown, it is difficult to discover the source of any movement in the thickets.

Wide ocean beaches, backed by low dunes, are nearby, and occasional trails lead off to them from the woodland highway. Up these beaches the great loggerhead sea turtles crawl to scratch out their nests, more frequently perhaps than on any other Carolina shore. Over 600 nests have been found in a single season on Bull's Island. You will not see turtles on a casual visit, even during the





Above, starfish wash up on the southern sands. Photographed by Hugh H. Schroder. At the right, flotsam and jetsam of the Bull's Island beach include cockle, long-knobbed whelk, surf clam, angel's wing and moon snail. Photograph by Robert C. Murphy.



breeding season, since their activities are carried on at night, but at certain seasons their tracks may be found.

At the northeast end of Bull's Island is a long sand spit enclosing a shallow bay, the mecca of the shorebirds. Here, in spring, the pretty little Wilson's plovers make their nests, close to those of willets, oyster-catchers and often black skimmers and royal terns. These may be passed over, however, in the excitement occasioned by the brown pelicans which nest on a tiny island just offshore from the main island. Like the black-necked stilts, these great birds are here at their northern breeding limits on the Atlantic coast, but unlike the former birds, they are present in good numbers, since more than 300 pairs customarily make their nests on this small spit.

On the bay side of the island a series

of dikes has impounded some 1200 acres of shallow water, and to this marshland the ducks—mallards, pintails, baldpates, teal, shovellers, ruddies, canvas-backs and others—find their way. Wood ducks are permanent residents, and around the margins Florida gallinules make their nests.

In increasing numbers, the faithful among bird students have been making winter pilgrimages to the island to join Alexander Sprunt and other kindred spirits on one of the Wildlife Tours conducted by the National Audubon Society or to join in the annual Christmas bird counts. Of recent years, Bull's Island has led all eastern localities in the number of species recorded on Christmas Counts, and has regularly held first or second rank in the nation. By steady progression the list has lengthened: 128

species in 1943, 129 in 1944 and 131 in 1945. And such birds! Nearly every year there are a few wintering long-billed curlews on the island, their most northerly known wintering ground. Marbled godwits, excessively rare at most Atlantic points, are to be found, their long slender wings marked with wonderfully rich patterns of chocolate and cinnamon brown. Even avocets, having first seen the light of day at some western lake, turn up in winter at Bull's Island from time to time. The 1945 count lists 7 species of heron, 17 species of ducks, 9 raptors, 19 shorebirds and 5 species of wintering warblers.

The presence on Bull's Island of so many species which are absent from the adjacent mainland serves to point up once more the conserving effect of islands. Were it not for islands many species with colonial nesting habits—terns, gulls, shorebirds and others—might well have ceased to exist along our coasts. It is no accident that some of the world's most spectacular concentrations of waterfowl are found on islands. Along the eastern seaboard one thinks immediately of Bonaventure Island with its gannets, murres, razor-billed auks, kittiwakes, puffins and Leach's petrels; of Cobb's Island and its skimmers, oyster-catchers, terns and gulls; and of Avery Island with its herons, to mention only a few. The Pacific coast has many notable island concentrations and, of course, the Peruvian bird islands have avian populations unsurpassed in the world.

Insularity may become a handicap to some species; there is a tendency toward specialization of food and breeding habits which may lead to disaster when conditions change radically. There have been tragic losses among island dwellers in the bird world due to impacts of the recent war. When any species is limited by narrow bounds, whether of food, geography or other condition, it is in grave danger. Yet with all this, islands have become blessed places of refuge for

hundreds of species and, barring man's interference, they should remain so.

The Cape Romain Refuge is one of the links in an expanding chain of wildlife refuges destined to become ever more important in the preservation of harrassed animals. From Long Island southward along the Atlantic and Gulf coasts there is a fringe of coastal marsh and brackish water bays, protected seaward by narrow strips of sand. To these marshes and bays from time immemorial have come for food and shelter the wintering waterfowl of half a continent. Vast as is the area, it has not been large enough to cope with the swarms of hunters who seek game in these concentration areas.

Without places of refuge, waterfowl in autumnal migration would be harried indeed, with no safe feeding and resting grounds. Fortunately, refuges have been and are being provided. Of these coastal fringes Dr. Ira N. Gabrielson writes in his book "Wildlife Refuges:"

"... they have already been damaged by pollution both by city wastes and by salt water spread by the intracoastal canal, and if they are ever destroyed the ducks of these two flyways (Atlantic and Mississippi) will vanish with them no matter how much they are protected by shooting regulations or how much good breeding ground may still be available.

"The Fish and Wildlife Service has been acquiring winter areas since 1932, intensifying the process in recent years. Plans call for a refuge in every great concentration district where management can increase the food supply over that now produced. . . ."

We may look forward hopefully to the time when thousands of miles of our coasts will have these refuges at strategic points, offering sanctuary to wintering wildfowl and forming natural areas for the protection of plants and resident animals. The project is ambitious but the portents are hopeful.

A wildlife refuge, once established, is not a static thing. It does not protect and

maintain itself. Unscrupulous gunners need more than signs to deter them—the services of efficient wardens are constantly needed. But if all poaching were stopped, the problems of maintaining food supplies at peak production would still be tremendous. A tropical hurricane sweeps away a barrier island, flooding the marshes with salt water and destroying the food of thousands of birds. A dike breaks, and the planting work of years is nullified in a few days. No refuge is ever a finished product, and the work of the refuge manager and his technicians is never-ending.

Let's look at some of the problems of maintenance and administration which Bull's Island faces constantly. The dike-protected 1200 acres of marshes which have been constructed offer perfect growing conditions for cattail flags, vigorously spreading plants which are worthless as food for wildfowl. To keep these cattails in check requires hard and constant labor and plenty of it.

Or take the wild turkeys of which the refuge people are justly proud. Dense forest and thick jungle do not favor a large turkey population; these birds like to feed in the open. So, by great effort, forest clearings some acres in extent have been made. In this region of lush growth they are, at best, but temporary things, and must have constant operational attention. Food patches, so necessary to meet the protein requirements of birds and mammals, must be cleared and planted each year. Let no one who has established a refuge think to rest upon his oars!

Bird students, even the more rabid ones, do not live for and by birds alone. When I turn toward the sunshine during a northern winter I am seeking something besides birds, although they will most certainly add piquancy and meaning to my trip. It would be a dull student of the outdoors who could come to the Carolina Low Country without thinking of the places and people and their history.

Just south of the Cape Romain Refuge lies Charleston "where the Ashley and the Cooper Rivers unite to form the Atlantic Ocean." These two streams perpetuate the name of Sir Anthony Ashley Cooper who was entitled to sign himself "Lord Proprietor of Carolina" in the days before Charles I lost his head. This dullard lived a pettifoggish life without ever seeing the rivers which bear his name, and certainly without ever having sensed the destinies of the new land which they drain. But there were others of keener vision, and they struggled and won against unknown enemies—heat, disease, piracy and the threat of the Inquisition.

Hard by the city of Charleston, the colonists fought the British from behind the palmetto logs of Fort Moultrie. In the swamps of the Santee, Francis Marion raised the banner of freedom, and withstood the redcoats through long and trying years. In Charleston harbor the nation began its travail when Edmund Ruffin set fuse to powder which sent the first shot hurtling toward Fort Sumter. In Charleston where Calhoun had thundered and while the war between the States was still in progress, the people showed the quality of their greatness when they accorded honored burial to a citizen who, although a strong and vocal adherent to the Union, had won universal love and respect through character alone.

Dubose Heyward and other writers have acquainted us with local color, and the visitor half expects to meet Porgy and his goat cart as he turns toward the waterfront from Meeting Street. Through the hot days the notes of Gershwin's "Summertime" come to

Where land and water meet at Bull's Island, strange creatures of the primeval ooze still lurk. At right, the alligator relaxed on a log takes a warm sunbath and appears to admire his own reflection in a still pool.

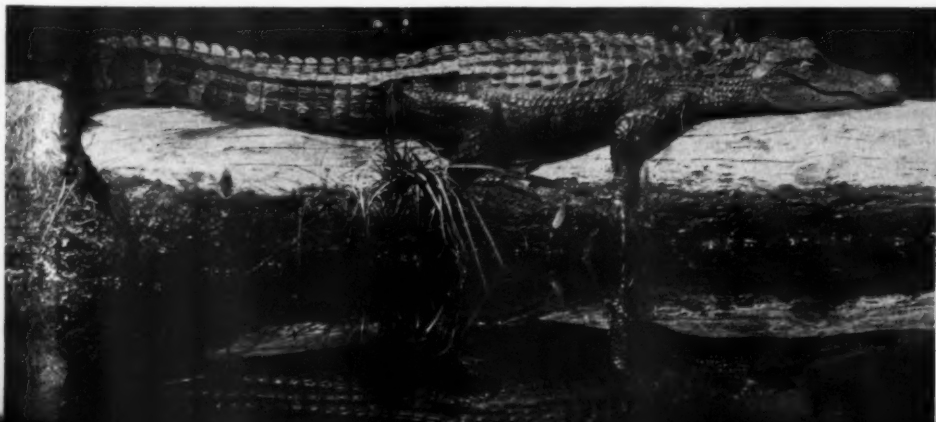


throbbing life, the melody consonant with the heat waves which shimmer over the landscape.

Ornithologically, this is hallowed ground. Charleston's natural history museum was one of the first, if not the first, on this continent. Here Bachman preached, and Audubon came to visit him. Here they described two elusive birds, Bachman's and Swainson's warblers, still little known and understood.

Arthur Wayne spent a lifetime in outdoor study and his spiritual descendants are even now opening to us the charms of Carolina bird life.

History sleeps within every live oak grove, and the draped long moss is a symbol of the land's venerability. But over on Bull's Island the changes of age are not apparent—America is still young, with abounding life and the freshness which only youth can know.





NIGHTHAWKS

make pleasant neighbors

—By Florence Page Jaques—

NIGHTHAWKS were once country-folk, raising their small families on barren ground, but when flat gravel roofs came in, they came too. They are now thoroughly metropolitan, and are welcomed by those urban dwellers who hunger and thirst after bird-watching but who cannot leave town for green pastures. An adventurer of fascinating originality, the nighthawk ranges from the Arctic Islands to the tip of South America.

Forsaking the ordinary pattern of bird behavior, he lives in deserted solitudes or on the roofs of crowded cities, according to his whim. He sleeps and eats at any hour. Concerning time, he is certainly not hidebound—or should I say featherbound—as most birds are. He performs his aerial-courtship dances not only in the mating season, but when the eggs are hatched and even after the young are grown. Then the year may be in the sere and yellow leaf, but not he! The female is equally unconventional. She spends no time concocting a cosy nest for her family; her eggs rest on roof or ground without benefit of twigs or down.

The nighthawk is not a hawk at all; anatomically it is related to the owls,

having a large head and wide skull, soft plumage, large eyes and nocturnal vision. Its tremendous appetite spells doom for many insects. A member of the goatsucker family, it has the characteristic mammoth mouth which droops back to open far under the ears, producing a grim look when shut and horrifying when open. Yet the beak and claws are weak and frail—this bird could not harm a baby!

Aside from the great mouth, the nighthawk is quite attractive in dark garb mottled with gray, a white chin-strap, and patches of startling white on the long slim wings, which make flight identification simple. When perching, it is easy to recognize too, for it sits *lengthwise* instead of crosswise on a bough or a rail (or a telegraph wire!)

At home in New York my husband and I have often watched nighthawks flying over the Hudson. But in the summer of 1944 we had a chance to observe a nesting pair at close range on the wide graveled roof of the Minnesota Museum of Natural History. It was a pleasant place, with a low parapet bounding it, treetops about, and rows of bear and wildcat skulls scattered about with caribou bones, in the sun.

One day I surprised a dark triangle of bird brooding her young in a sheltered corner. She flew off to land flat in the middle of the gravel roof, hissing furiously. There she lay with beating wings, her scarlet mouth gaping open like a big trumpet flower. Since her weird appearance and sizzling did not chase me away, the worried mother changed into a pitiful creature. With trailing wings, she inched across the gravel helplessly. She seemed legless and, zigzagging forward painfully on her breast, she panted as if each gasp would be the last.

Her fright was real even if her injuries were not, but I decided I must see the babies. There were only two,—little puffs of pale tan, mottled with brown, exactly the color of the gravel on which they rested.

They lay perfectly still. I sat down to watch them, but it began to rain; and as I had read that a nighthawk never left her young exposed to raindrops, even to find them food, I departed.

The following morning, June 29th, the nighthawk was brooding the young and was asleep when I rounded the corner. She suddenly awoke and in one swoop reached the middle of the roof, spitting and threatening, her wings held in flat, rigid semicircles and her whole body rocking and menacing.

For half an hour, I tried to look as much like one of the wildcat skulls as possible, hoping she would go back to her charges. Instead she dragged herself forlornly across the gravel till I wondered in spite of myself if she *had* lost her legs. With body flattened out in the sun like a scorched pancake, she beat the air with one wing while the other lay

as if broken. A nighthawk may even throw herself across the top of a stump or rock, lying there with head hanging down, one wing dangling limp, and uttering doleful cries!

Since she refused to go back to the motionless chicks, I walked over to them. The little speckled powderpuffs with long oval eyes rose up defiantly on tiny legs, lifted their scraps of wings high over their backs and hissed. When their courage suddenly gave out, they took to their heels, and as they ran frantically along the gutter, absurd downy pantaloons twinkled about their ankles.

On the next evening, when Lee and I went up, all three were asleep. It was a serene evening, treetops swayed in a soft wind, ivy circled the parapet, and the skulls, even though fanged, made the scene quite Shakespearian. Feeling literary, I named our nighthawk Muckle-mouth Meg. But we called the youngsters merely Pat and Mike.

As twilight came on, the male came over, shouting his call, a strong nasal—*peent—peent*. Meg did not respond. Mike popped out from under her feathers but must have been ordered in peremptorily, for he disappeared.

Suddenly the male came down in the dramatic plunge of courtship display. In this, he throws himself headfirst, the long wings lowered beneath the body and thrust forward with the feathers far apart. The upper quills point down and



*Drawings by
Francis Lee Jaques*

are thrown edgewise, vibrating strongly and making a *thrrrup* or booming sound. How surprising that a bird of such light weight can produce so much resonance by this means!

He plunged several times, then lit on the parapet. He was black instead of brownish like his mate, and his pure white chin-strap looked like a large mustache.

Meg flew from the corner and clucked at us, but as she didn't sizzle or flop I thought we might see the young ones fed. I was curious about this, for the late Dr. Roberts, then the museum's director, had said the parents regurgitated insects they had swallowed. Lee, however, said her cluck was a disturbed signal, such as grouse make.

The male took to flying in circles, coming straight at us, just missing our heads and, although we waited until dark, neither bird went near the chicks. But at least we had found that the male took an interest in his family.

When on June 30th I went to the roof, Meg flew off at once but without particular alarm. Mike (the darker and more aggressive of the chicks) ran briskly down the gutter. Pat flattened out against the ground. I didn't know the sex of the babies but I decided that Mike was a male and Pat, more timid and gentle, a female. Lee laughed at this reasoning.

I picked up Pat—such a light little ball of fuzz! Tiny brown feathers were showing now on back and head, but the little wings, raised high in fright, were still downy. When she finally snuggled down in my hand I felt ridiculously gratified.

Mike had run into the corner and I put Pat beside him, so they would be in view from the tower window. Frightened by my attempt to herd them together, they yelled at the tops of their tiny voices, and we all lost our heads as we scrambled about. Meg flew hastily down to the roof—this time with broken tail, dangling at right angles to her body.

Now they never would accept me, I thought dejectedly. How not to make friends with birds—I had certainly given an example of that! I was furious. People who write books about birds always seem to do the wise thing at the right time; they're never the dumb animals themselves.

After that I decided that my place was inside the tower with the elevator machinery. About sunset the next day, as I watched from my concealed position, I saw the two youngsters pop out from Meg's wings and reach up to tug at her beak—their way of asking to be fed. Mike was hilarious, and ran about gaily, with his small wings held high.

Soon Meg ordered the babies under her feathers and settled down, rocking comfortably from side to side. She seemed to rock on every occasion, when scared, contented, interested or sleepy. She even rocked when she flew.

After sundown Pop's *peent-peent* sounded overhead. Meg fluffed her feathers till she looked like a beautifully patterned teakettle with her head a knob on the cover. Suddenly she flew away.

Soon she was back and the babies ran to her. Then Pop flew down with a zoom, the flashes of white at his throat





and tail and wings making his landing very spectacular. Pat and Mike ran to him, stretched up on tiptoe, and he fed them, putting his beak well inside their gaping mouths. The regurgitation was a shorter process than I'd supposed. While Pat was fed, Mike jumped up and down on both feet, waving his little wings in wild excitement, like a youngster begging for candy.

After this Meg moved the children far across the gravel into the southeast corner. Surely no bird ever had such a gigantic nest—a whole museum roof.

During the day they seemed to like to sit in the sunlight just at the edge of the shadow from the coping. Out of babyhood and now in the urchin stage, the young looked rumped, funny, and untidy. Their heads had become wide and flat, and loose down, sticking out in all directions, gave each a fuzzy halo, though they looked far from saintlike.

All three birds preened at length, though for such a thorough grooming the results were negligible. A sparrow on the parapet, who looked over the edge just as Meg yawned, screamed loudly. Hop, hop, hop, and then he simply had to lean over and look again. "What impossible people!"

From this side of the tower I could watch the evening feedings at close range, though it was maddening to have them always occur in deep twilight. Pop usually began to shout about sunset, and Meg, after letting him call impatiently for a quarter of an hour or so, flew off to him. The youngsters were painfully

good during her absences. They hardly moved, except to turn their heads when the adults came over, or to stretch out a wing now and then—at which time they usually laid their heads down, flat on the gravel. It looked odd but may have been a device to keep their balance.

Meg and Pop came down at dusk. Pop's feeding of his children was quite perfunctory; he did his duty and brought home the bacon, but he wasted no time in delivering it. It was whisk! down the hatch; then he was off, his white mustache gleaming in the twilight.

Meg, on the other hand, sent the food down at a steady rate. With her beak in a gaping mouth, her neck pumped up and down vigorously. Her favorite, Mike, was fed first and more; Pat got the dregs. Perhaps Pat was father's favorite for she kept pace in size. He worked too fast for me to tell.

One afternoon, when the chicks were about seventeen or eighteen days old, I failed to find them. Finally I saw one youngster crouching by a bear skull. As I gazed, it took off over the low parapet.

I was as astonished as if I'd never suspected it had wings. Looking over the south wall, I saw both on the lower auditorium roof. Meg was in the center, between them. Flat, with wings spread and mouth a wide cavern, she was as fierce as a tiger as she protected them on their first flight.

That evening Mike and Pat were huddled together, alone. The nighthawk calls, beginning much earlier than usual, were more constant and piercing. Did



Meg and Pop know where the youngsters were?

At dusk I heard Pop's zooming drive; then both parents landed at once, Pop in the center of the roof and Meg, as always, near the young but far enough off not to give them away if an enemy were present.

The chicks remained quiet, as usual, awaiting the parental signal. I saw Meg utter a call note, though I could not hear it. Instantly the young ran to her. She fed Mike hurriedly, but not Pat, poor feathered Cinderella.

Pat and Mike remained in the middle of the roof when Meg disappeared. She soon came back, fed Pat sketchily, then loaded Mike with food, pumping insects into him until I wondered how he could stand the strain. But nighthawks have enormous stomachs. Statistics on their contents can hardly be believed—500 mosquitoes swallowed at one time, 1800 winged ants, 60 grasshoppers. Luckily, a nighthawk's digestion is also remarkable.

Pop came down, flashing a display of white, and fed Pat in a flash. Poor Pat! I complained next day to Dr. Breckenridge of the museum staff that Meg favored Mike shamefully. But Breck said, for rank favoritism, to take a marsh hawk. He had watched one female feed three of her chicks adequately and utterly ignore the fourth. It grew scrawnier and weaker and finally died. The mother then fed it to the other three!

The two youngsters toddled to Meg and sat in front of her, leaning their heads against each other. They looked like an old-fashioned photograph of an

affectionate family group; this was the first time the chicks had paid the slightest attention to each other. They preened and exercised their wings constantly now.

Meg flew off, and though now as large as she, they remained obediently still, far too good to be interesting. But they may have been threatened with our re-appearance if they disobeyed orders. I have said much about their queer features, but they may have remembered us as did the fish in Leigh Hunt's sonnet:

O flat and shocking face,
Grimly divided from the breast below!
Thou that on dry land horribly doth go
With a split body and most ridiculous face,
Prong after prong, disgracer of all grace.

When Meg returned she landed across the roof and gave the call note. They flew over to her: she was now making them try to fly before she fed them.

After this, she no longer stayed with the young in the daytime. They were alone all day.

On July 20th they were making short flights. At dusk Meg flew in and fed Mike. All three then flew to the center of the roof and Meg fed them both, after which Mike boldly flew out beyond the roof edge. He came back, then flew with Pat in circles around the roof. Landing on the gravel, they touched beaks. They did this several times; evidently a form of play. I was glad they had finally discovered each other. As I left, both adults flew down—Pop had not lost interest in the family.

On the night of July 22nd, when the young nighthawks were almost four weeks old, the whole family were flying

gaily about, playing tag around the roofs. They were catching insects, of course—perhaps the old ones were showing the young ones how.

Finally a fifth nighthawk tried to join the party, but was chased away. By Pop, I thought. After this, three of the family disappeared completely and one was left alone, flying round and round the roof and low over the trees, *peent-ing* sadly, with a shorter note than the adult makes. I'm sure it was Pat, who never left home as easily as Mike did.

She seemed to have orders to keep on with the practice-flying, however, for she never alighted on the roof, but flew hither and thither, crying constantly. Poor Pat, I knew how she felt. How often has Lee left me standing in a thicket or a bog while he goes off to investigate something and is gone longer than it is possible to be gone unless he has met an untimely end! On such occasions there is nothing I can do but yell, "Lee!—Lee!" in plaintive tones.

Long after, the other three came jauntily back. Then Meg shouldered Pat to the roof. But Mike became unruly; Meg had to dive at him before he would alight. She circled over, then went down, and a minute later Pop came in. Were both parents still feeding those big babies?

This was a great night for nighthawks. I had regretted not having seen Pop court Meg, but this evening a nighthawk over another roof gave the real courtship flight-dance. Spring was in the air, for him.

The female was somewhere on that roof. The male flew round it in circles, repeatedly making the swift plunge, headfirst, which ends in the resounding *thrrrup*, as the wing-feathers vibrate in the quick upward turn at the last second

before he strikes the roof. He had a variation on this too, in which he plunged and soared upward at a less abrupt angle, the speed increasing on the upward swoop. He dove from every direction. When he circled, his customary tilting flight was much accentuated, and as he shouted his *peent*, far louder than usual, his fluttering wings were only blurs. It seemed impossible for those long wings to vibrate with such rapidity.

This was the complete courtship dance, except that he did not land near the female. Instead, after many of his spectacular plunges, she flew up and around in a wide circle, he after her, both calling and tilting. It reminded me of the performance of the English lapwing, though not as wild and abandoned.

For a week or so longer Mike and Pat came to the roof by day, though Mike was erratic about it. This was in great contrast to some young robins, which left home within twelve days after I first discovered them, newly hatched; for it was well over a month since I'd discovered Pat and Mike, clothed and up and about, yet here they were still lingering near the nest.

On the third of August, Pat was alone in the roof corner. On the fourth, both Pat and Mike were on the edge of the great nest, sleeping all day on the stone coping in the hot sun. After that, I did not see them together again.

On August 7th, one was still on the parapet. Pat was clinging to the old homestead. But after that she was gone.





THE western sky was a glowing arc of gold. The sun, like a gigantic ball, almost touched the sharp horizon, with distant palms etched against its brilliant backdrop in black rigidity. No breeze swayed the grass-tops or rustled the stiff fronds of the scrub palmetto clumps which stood as motionless as though cast in bronze. No sound of beast or bird broke the monumental stillness—the kind of stillness that produces in one's ears a steady, muted humming, sometimes noticed on the peaks of lofty mountains.

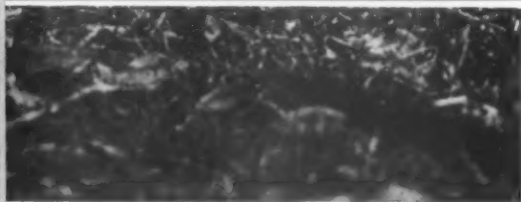
I sat cross-legged on top of the warden's car, even that slight elevation making possible the survey of a vast stretch of flat prairie wilderness. The warden himself leaned easily against one front fender, his lean, muscular body falling into the careless grace of the lounging cowboy. His gaze was fixed on the west, where the wooded shoreline of unseen Lake Istokpoga topped the horizon in serried silhouette. Suddenly he spoke, the sound of his soft drawl almost startling in that vast, enveloping silence.

"Here they come," he said.

At the same instant a faint, far rolling cry came drifting thinly across the distance, and two black specks took shape against the golden glow above the sun. They grew steadily larger, wide wings beating ponderously, each broad sweep ending with a peculiar upward flirt at the top of the stroke. Long necks outstretched, long legs trailing, the thin

KING of the KISSIMMEE

—By Alexander Sprunt, Jr. —



bugle notes growing ever louder, the great voyagers swept toward us, passed overhead, and wheeled toward a nearby pond hidden in the tall grasses. Huge wings flapped heavily in reverse stroke, long legs dangled loosely, and the birds dropped into the shallows, to stand

alertly erect, keen gaze searching the surrounding edges. The cranes were coming in to roost.

For the next forty-five minutes we watched, counted, and checked. In singles, couples, trios and squadrons they came, low over the scrub, or high in the glowing sky, voicing their clarion notes, sweeping in from north and west. The sun disappeared, the bright glow faded, and dusk crept in purple flood over the Kissimmee Prairie. The cranes had come to roost. We totaled up our count and bounced jerkily over the prairie trails toward Okeechobee, well content with the end of day. Seven hundred and forty-six of the great birds had come into the Fish Branch ponds that night.

Always on any "must" list of birds to see in Florida, this king of the gray-green prairies is one of the most interesting species in a famous avian state. Though a geographical race of the sandhill crane, it is invariably referred to by the natives as the "whooping" crane. Naturally enough, this causes confusion in some minds. The natives insist on "whooper" because of the bird's vocal attainments, but how surprised they would be should a real whooping crane appear on the Kissimmee—and what would they call it?

Always a bird of the open spaces, the Florida crane need not be expected anywhere else. Now and then a pair will frequent some remotely wild savanna of the Big Cypress country, or the pine-lands of the west coast, but the real domain of the regal bird is that tremendous sweep of open country in south central Florida between Kissimmee and Lake Okeechobee. It is an area little known to the average tourist; he sees parts of it when going between Lake Wales and the east coast and from Fort Pierce to Tampa. These stretches are crossed at top speed, with only annoyance at the barren, interminable wastes spread on each side of the rushing car! Just as many traverse the Tamiami Trail with out-spoken disgust at the lack

of anything to see; so it is with the Kissimmee Prairie. Yet both regions are actually vast storehouses of interest and life to those who take the time to look.

It is a strange region, one utterly unlike the glittering artificiality which characterizes the coastal sections. Huge ranches dot it here and there; cowboys, cattle, rodeos and round-ups are commonplace. There are horizon reaches of grass and saw-palmetto; there are scores of islandlike "hammocks" of oaks and cabbage palms, standing darkly amid a veritable sea of varying greens. Here live the caracara and the burrowing owl, the grasshopper sparrow and the red-shouldered hawk, all dwarfed and dominated by that truly splendid representative of avian royalty—the Florida crane.

If one knows this prairie country well, observation of this great bird is a certainty, and no one need be disappointed in a search for it. Chance attempts, however, from the few paved roads which traverse the region might well result in failure, so it is best to have time and a guide.

For a bird so large and conspicuous, it is remarkable how easily it can escape observation most of the time. The tones of its plumage blend inconspicuously into the tremendous background of scrub and grass, and so vast is one's outlook that a feeding bird amid the landscape can be, and often is, overlooked. Ideal locations are places where recent fires have swept the prairie, such spots being known as "burns." Here the cranes, perhaps several, stalk about in full view, searching for roasted insects or exposed roots. Now and then, a pair may actually stand in the middle of a sandy prairie "road" while an observer takes a photograph through the windshield of the car, as has been done on some of our Wildlife Tours.

The big birds are generally dry land feeders, although in nesting and roosting they depend on water. Much of their food is vegetable, a favorite item being what is locally known as "pink-

root," a common tuber of the prairie country. As a result, the flesh of the bird is highly palatable, and the natives have long sought it successfully. Great numbers have been killed for food, and some have found their way into famous hotels and restaurants under a variety of names! The birds are difficult to stalk when feeding in the open country, but it was when they were coming in to roost that they were shot. Flying in low over the palmetto clumps, they offer targets about as hard to hit as a barn door. Scores could be, and were, secured by a single gunner under such circumstances.

Collectors, too, have played a part in reducing their numbers. Skins and eggs were prized items and many a cowboy has been enlisted to gather them. A set of eggs which might bring a native collector fifty cents frequently brought twenty-five dollars on some more distant market. It was this shooting for food and collecting for cabinets that, in 1936, led to the institution of warden protection for the crane on the Kissimmee Prairie by the National Audubon Society. The warden then entrusted with the work knew the ways of the prairie

folk and for many years rendered yeoman service in bringing the cranes back to a population which resulted in such sunset counts as that described in the beginning of this article. Warden Marvin Chandler also originated the idea of marking every set of eggs he found with an indelible rubber stamp, consisting of the words "National Audubon Society." It may be imagined how much such a set of eggs would bring in either cash or exchange!

In its nesting habits the crane exhibits unusual and interesting characteristics. The courtship is marked by a family trait known as the "dance of the cranes." Gathering in a customary spot, several of the males go through a remarkable series of jumps, hops and leaps, with outspread wings, accompanied by much bowing and scraping, all for the benefit of watching females. To witness one of these performances is to see nature in its most fascinating form. This dance has been beautifully photographed in slow motion and color by John H. Storer.

Once mated, the cranes begin their nest building, sometimes as early as mid-February. The home is a watery one, for the nest is almost invariably in the cen-



"The real domain of the regal bird is that tremendous sweep of open country between Kissimmee and Lake Okeechobee." This photograph by Hugh H. Schroder. Others by Allan Cruickshank.



ter of a prairie pond amid a growth of flags or "wampee." The birds pull up quite a mass of the roots and clear an area several feet across, in the middle of which the moundlike nest rises a few inches above the water, and acts as a receptacle for the two very large eggs. The sitting bird, or the nest, is rarely visible from any point of the pond's shoreline, and one is obliged to do some wading to examine it. Even a few feet distant the nest is remarkably inconspicuous, and as incubation advances, the bird does not move until an intruder is quite near.

The youngsters emerge from the egg covered with a beautiful buffy down and are able to leave the nest shortly, following the parent out to the prairie where they are assiduously cared for until they are able to shift for themselves. It is a difficult matter to locate a young crane even if the searcher is quite convinced that it is close by. The little fellows are adept at hiding and match their surroundings exactly. Frequently, only one of the two succeeds in escaping the dangers which beset them, and often, in succeeding months, you can see three

cranes feeding and stalking about the prairie—the male, the female and a youngster. Very rarely are three eggs laid or hatched.

The roosting habit is a strongly developed one, and congregations of the birds occur through the fall and winter in certain favored ponds. They spend the night in the water and about dawn walk out to an accompaniment of a tremendous chorus of sound, either to fly to distant feeding grounds, or to browse about in the vicinity.

Although the crane occurs outside Florida, it does so but sparingly. A few persist in parts of the great Okefinokee Swamp in southeastern Georgia, now a federal refuge, and small numbers are to be found in remote sections of southern Alabama and Mississippi. To see them there, however, would be a most difficult task for anyone except a resident with knowledge of the country.

The state whose name the bird bears is the one with which it is most intimately associated and where you are most likely to encounter it—on the great reaches of palm-dotted prairie, its chosen home. Long may it live and prosper.

ALBATROSSES

MODERN MARINERS KNOW
NO DREAD OF THE "BIRDS
OF ILL OMEN" WHO OWN
THE WASTES OF THE SEA



ROLLING along, pitching and squatting, with thousands of wheels and rods turning and pushing, with a crew swabbing and oiling, measuring and recording, our ship seemed alone in the world. Our lives became as drab and gray as the weather that prevailed.

No wonder, then, that the sight of those sky-silhouetted wings in the distance brought a lift to our spirits. Those were not the comfortable, sturdy wings of gulls. They were the extravagantly long, slender wings of albatrosses!

These birds brought us what we needed—the embodiment of an ideal, something superb, something free and untroubled. Their flight was more graceful than the softest dream. Out of nowhere they came to follow us, feeding from our wake, first one and then an interlacing flock of fifty, in the middle of the Pacific, the greatest waste any of us had ever seen.

To us a voyage was known in the language of purpose, a business, a going from some place to some place, with reason, with result. Yet without a house, without a garden, without war, a far more magnificent kingdom belonged to this bird more surely than a spaded grave belongs to us. There he was, strong and complete, a law unto himself as he sailed along with his hooked bill stretched out before his sovereign gaze and his toes crossed nonchalantly under

By *Herbert Clement*

Drawings by Bill Dilger

his tail. It was fine to watch a creature without a hand holding a tool or a flag. It filled the heart to watch him live at leisure, partaking without anxiety of the providence of God.

Not a miniature of perfection, the albatross, not a fragment, his body was full and his wings spread wider than our arms. When the ship staggered and shook in a vortex of the elements his boldness and ease remained as ever. In gale or zephyr, with but a slant of his outermost feathers, without a plan, without a calculation, he navigated his endless swift circles about our rusting, straining craft of monstrous means. Turning to face the wind he rose effortlessly as though drawn upon a ray of sunlight. Then poised in nothingness, higher than our topmost deck, he seemed borne invisibly, free in three dimensions. After his survey, he veered roundly and slid in swift trajectory toward the waves; so swift, that the rippled waters behind him blurred across our eyes. He hugged the surface of the sea as close and sinuously as a snake the land, dragging a wingtip in a crest, making little circles and tracks. The greater the waves the more he played, at times appearing suddenly

out of a white crest as a skier off a jump. Could ever he be plotted on a graph?

In our routine world, the albatross alone was an unpredictable, charming personality. Here was a creature supremely indifferent to the United States Navy! A monstrous whale our ship must have seemed, a belching fish that never dived and yet unwieldy in its ramrod path, never paused to sun itself and enjoy the world at ease.

How we envied and coveted the Olympian serenity of that bird! Did eating our waste inspire a feeling of inferiority in him? Not in the least perceptible tilt of a feather! When he gobbled down his meal he just gave him-

self a fillip and floated up as dignified as ever. Who could belittle him? The baited hooks the sailors trolled were never touched. Without arrogance, without fear he would come sailing over our decks an inch or two beyond a reach he forbade us to extend. And when he tired of our unresponsiveness he left us to our fate and lofted off to better climes. That was indeed a bird!

If ever droning bombers, burdensome transport, or sound-fast fighters were compared with him he made us remember how he could unlimber his long web-footed legs, crook his wings low over the sea and paddle as though walking over to a meal he never labored to earn. What machines can do he made seem paleolithic.

It was a sad day when the albatrosses left us. Though they never said more than an infrequent *creep* over a bit of refuse, they were good company.



The Wonderland of the Florida Keys

By Robert P. Allen

Map by the Author

THE big truck, equipped with heavy canvas tanks and mechanical aerating system, was loading live fish at a dock on the ocean side of Key Largo. As soon as the last fish was aboard the truck would start on the long drive of nearly 400 miles to the exhibition aquarium in northern Florida.

A bystander contemplated these facts and was puzzled. "Why do you come 'way down here for your fish?" he asked. "Listen, brother," said the truck driver patiently, "they jest don't have fish like this anywheres else!" And he pointed emphatically at a tubful of queen angels, blue parrots, squirrel fish, butterfly fish, blue tangs and beau' gregories.

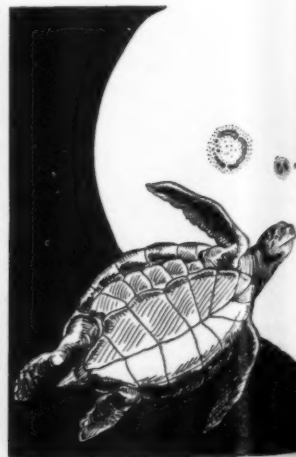
The puzzled tourist may not have known it but there are a great many things in and around the Florida Keys that "they jest don't have anywheres else." In all of this wide and varied land of ours there is no place so full of surprises as this tropical wonderland. The strange fishes of the offshore reefs, some of them as colorful as anything in the ocean, compete with brilliant sea fans, large pink-lipped conchs and glass-smooth, softly marked cowries. Unless

you know where and how to look for them, these and a thousand other items of great beauty and interest lie hidden beneath the surface of the sea, a surface that is in itself enchanting enough to satisfy the most demanding connoisseur. For at one moment these waters are pale green with edgings of soft blue and lavender, and at another they may be a deeper blue, with patches of brown and wide streaks of gold.

Only in Florida Bay, that mysterious region of shallow, reef-locked "lakes" and uncounted mangrove keys, can one see, on the same day, roseate spoonbills, reddish egrets, great white herons, white-crowned pigeons and man-o'-war birds.



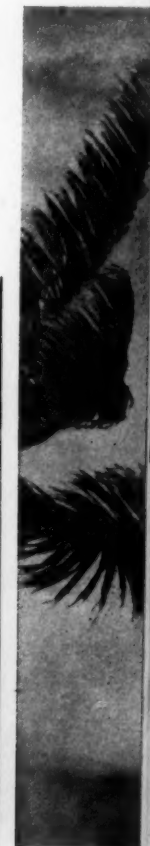
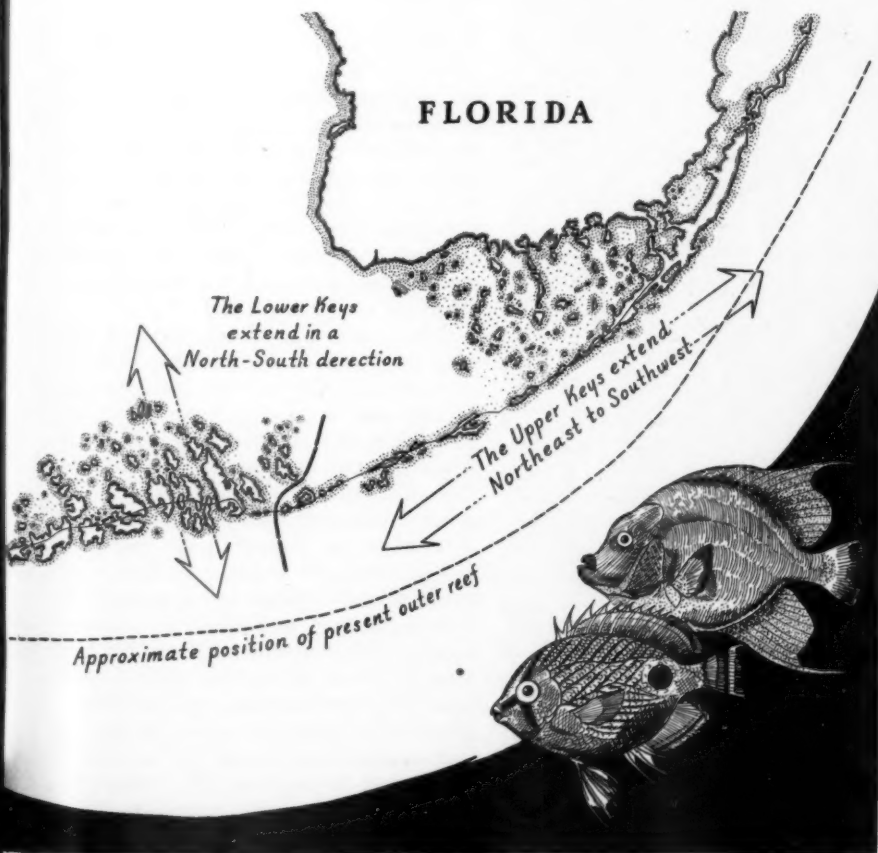
THE Lower Keys are evidently older than the Upper Keys and may once have been a single large island, or even a peninsula connected with the mainland. They support a flora and fauna more akin to that of the mainland than to that of the Upper Keys. The Upper Keys are probably an ancient reef, exposed by a lowering of the ocean after the last glacial period. Their fauna and flora are derived chiefly from the West Indies.



Indeed, any one of these birds, by itself, is worth a trip to this amazing land. Here also is the last abode, within our borders, of the American crocodile, shy reptilian hangover from a past that did not include man or any of the mammals, a creature that is much rarer and different in physical appearance and habits from the more familiar alligator.

On the Upper Keys the flora is more akin to that of Cuba and the Bahamas than to that of any portion of the United States. Geologists seem to think that the line of keys from Biscayne Bay and Key Largo south to Bahia Honda were once a submerged coral reef, similar to the outer reef of today. At the end of

the last Glacial Period the oceans may have assumed lower levels and this subsidence would account for the exposure of this inner reef, the Upper Keys of today. The bare coral rock gradually accumulated a variety of debris, nearly all of it deriving from the nearby West Indies, some carried by ocean currents, including the Gulf Stream, others more quickly and violently deposited by hurricane winds. We can be sure that outstanding among the vegetable debris were the viviporous seedlings of the red mangrove, supreme land builder. In time—of which there was plenty, a century being a mere breath in a story like this—enough shell, sand, decayed leaves



The mangrove habitat provided a protective screen for the last nesting group of roseate spoonbills found in Florida.



Photographs by Allan Cruickshank



and rotted wood fibres had been caught and held in the complicated web of mangrove aerial roots to foster the growth of other trees, shrubs and salt-loving grasses. Eventually a thick humus was formed over the bed of rock, with a rich variety of West Indian hardwoods, palms and other plants springing from it. In a thousand years or two, what had been a bare reef now supported a dense tropical vegetation brought to it by the sea, a flora that finally included more than 600 species of plants.

Land snails and insects of West Indian origin also arrived by way of wind or wave, and the molluscan life of the present day is strongly tropical. I collected a spider on Key Largo that had never been found previously in the United States, claiming Haiti at its home; while in the little known confines of Florida Bay I lived in my tent with an inoffensive little house spider for an entire winter without being aware that it was unknown to Science. In a region such as this there is still much to be learned of an elementary nature, new species to be described—spiders, insects, plants—and doubtless many subspecific hairs patiently awaiting the splitter. It was as late as 1930 that Dr. Nelson described the geographic races of raccoons from the Florida Keys, a first-rate ex-



ample of the more obvious workings of recent evolution in a habitat that is both handy and a well-constituted natural laboratory.

At almost any season the visitor may see mangrove seedlings or other plant seeds floating in the life-filled waters around the Keys. In August, when the red mangroves are heaviest with their precocious fruits, the currents are often thick with these persistent voyagers. Rarely you may see the round seed of the bussa palm, which has completed a sea journey of three to five thousand miles from its native South America. Even fish of fresh water preference may find their way from West Indian habitats to a limestone sink in the interior of Key Largo. One day a surface stirring in the dark waters of such a depression suggested the presence of small fishes and I swept the area with my dip net. From the semi-darkness beneath a low, overhanging rock formation I secured several tiny fish that were not only unknown to me but quite definitely blind! Life in the shadows had caused a membrane to grow over their eyes and they had completely lost the use of those members. Furthermore, they turned out to be of a genus described from Haiti and never, before or since, seen in the United States. How did they get to this limestone cavern

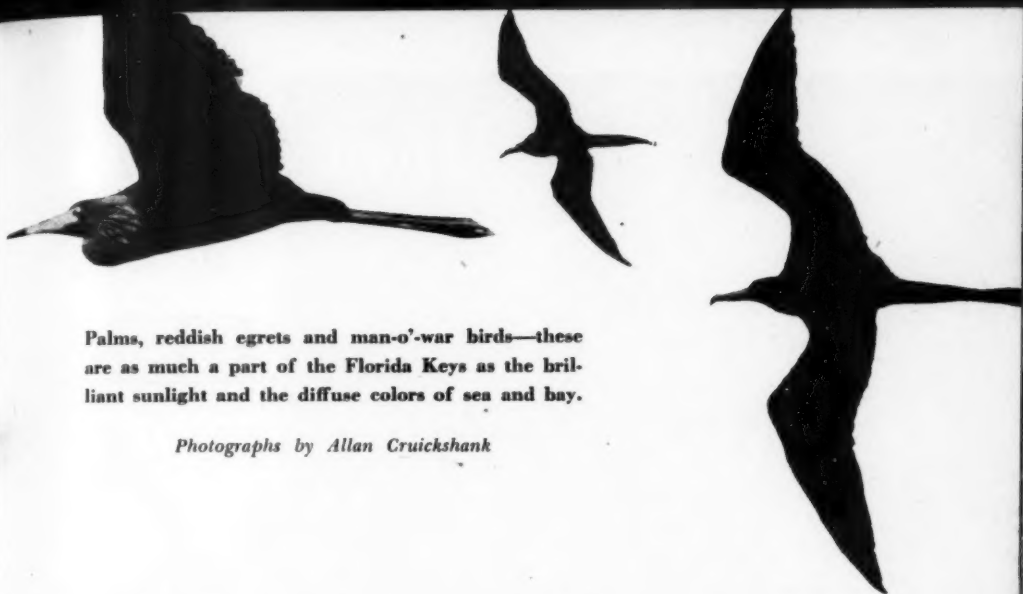




in an uninhabited jungle of mahoganies, poison woods and gumbo limbos well inside of Key Largo, U.S.A.? Your guess is as good as mine.

In summer the southeast trade winds are clean and soft from over the Gulf Stream and help make the Keys more livable than most parts of the Florida mainland at this season. The sea, which lies on every hand, brought life to this ancient reef and is still the hub of its existence. Commercialization has inevitably depleted all of the most widely appreciated edible fishes but the local resident can always find plenty of grunts, snappers, grouper and other common varieties for his table, while in his yard grow more than enough of the delicious Key limes for flavoring daily *filets*. The spiny lobster, or Florida crayfish, taken commercially as far north as Palm Beach, is seriously low in numbers but the resident of the Keys can still find a few for supper. He is probably right when he insists that if taking these crustaceans for profit could be stopped for a few years they would regain their former abundance.

In summer the gray kingbirds, cardinals and ground doves are everywhere. Black-whiskered vireos and Key West vireos call from the hammocks and the



Palms, reddish egrets and man-o'-war birds—these are as much a part of the Florida Keys as the brilliant sunlight and the diffuse colors of sea and bay.

Photographs by Allan Cruickshank

large, handsome white-crowned pigeons are seen feeding on the abundant wild figs and poison wood berries. On some of the keys in the bay black-necked stilts nest in colonies, one such group being only a few yards from a shell beach that is a favorite crawl for the rare crocodiles. On the ocean side in summer you may see young green turtles no bigger than your hat. They have come here from their natal beaches in far off Campeche, attracted, as are so many other creatures, by the charms of this salt water Mecca. More numerous are the big loggerhead turtles that deposit their eggs on sand beaches on the Matecumbe Keys and at other nearby locations. Hawks-bill turtles are often observed in the area but the rarer trunk turtle is seen less frequently.

In winter many familiar northern migrants stop in this wonderland for the entire season, other birds pass over the Keys en route to Cuba or South America. In November, when it may be bitter cold up North, the resplendent spoon-bills are pairing and nest building in Florida Bay. And in January, when the pink birds are hatching, the great white herons are right in the middle of their nesting season. Prairie warblers sing all day long and only a "norther," with its

dark skies, prolonged winds and lowered temperatures, can destroy the illusion of eternal summer.

Winter or summer, there are no such colors in sea and sky anywhere. Nowhere else in the United States are we so close to the tropics. It is a land where the details, often subtle or completely hidden to casual eyes, will amply fulfill Charles Torrey Simpson's description of a typical Florida shore, where we may "constantly find the unbelievable and . . . continually unravel problems in evolution and the mysteries and purposes of life." The chitons on the deeply eroded calcareous rocks; the pink birds that, by some miracle, have clung to this last of their Florida strongholds; the strange and beautiful fishes of the warm and brilliant waters; the rare palms, wild tamarinds and gumbo limbos—these contribute to an atmosphere and a flavor that is of never-ending interest. And finally, to give them the last touch of uniqueness, nowhere but in the Florida Keys do native-born Americans drop their h's, just as their remote English ancestors did when they sailed from a Thames-side dock for this amazing New World where lobsters have no claws and creatures of the land live and flourish on an ocean reef.



Home-coming of the ELK

Karl and Edna
Maslowski

By Grace V. Sharritt

THE dusk of autumn shadowed the Wyoming foothills of the Teton Range with a haze of smoky blue. In the valley the willow bottoms showed purple and on the slopes the sagebrush flung a mantle of brown against the late November afternoon. Dim figures moved in the willows. Along a mountain top other figures silhouetted the skyline. There was the cautious crackling of brush, an occasional wild squeal, sounds of hooves treading earth. Then silence.

As your eyes became accustomed to identifying animate objects, as well as trees and sage and rocks, you were amazed to see the mountainside in motion. Minute figures, en masse, gave the slope the appearance of a Gargantuan anthill with four-legged creatures intent on going in one direction. That direction pointed down the slope across the highway where you stood in breathless

excitement, and on down into the bottoms and across the Buffalo River.

From there on, scores of trails would lead up other mountain tops and down into other gullies as snow and instinct drove thousands of animals forward to the National Elk Refuge (about forty miles distant) at Jackson, Wyoming. This trek was the beginning of the fall migration of the most gorgeous stag in North America; the elk, or wapiti.

"They are coming home," said Almer P. Nelson, manager of the National Elk Refuge, which quarters the largest concentration of elk in the world, "Coming home for the winter. I wonder," he added, "how much hay the government will need to feed them this season?"

In the dim November twilight, the numbers of elk were countless, although Mr. Nelson estimated several thousand as we drove along twenty miles of high-

way between Moran and Turpin Meadows. In another month an estimated six or seven thousand bulls, cows and calves would be safely sheltered within the refuge area feeding contentedly on hay cultivated and provided by the government.

It was the new-fallen snow and some ancient memory which had started the journey of the elk to the refuge on this particular afternoon. Like wild ducks or geese or whales or certain species of butterflies, elk also migrate in spring and fall from one feeding range to another. It is food which prompts a teal to fly to southern marshes when northern waters are ice-covered. It is food which prompts an elk to wander from wilderness mountain meadows to valley and plains where grasses can be found beneath the snow.

But it is a certain food and shelter which prompts approximately half of the entire Jackson Hole herd (estimated in 1945-46 at about 15,000) to migrate from the headwaters of the Snake River and the timbered slopes of the Gros Ventre range to the winter home conserved and managed especially for them by the U. S. Fish and Wildlife Service of the Department of the Interior.

Every nerve in your body thrilled to this immense movement of wild creatures in a gloriously rugged country. You thrilled to a deep sensuous rhythm of the primitive. Gone were the bison ranges, the buffalo herds, the flocks of passenger pigeons of an earlier day. Here was a flaming echo, a last brilliant challenge of that era when America was young and lusty and rich with wildlife of every description of fur and fins and feathers.

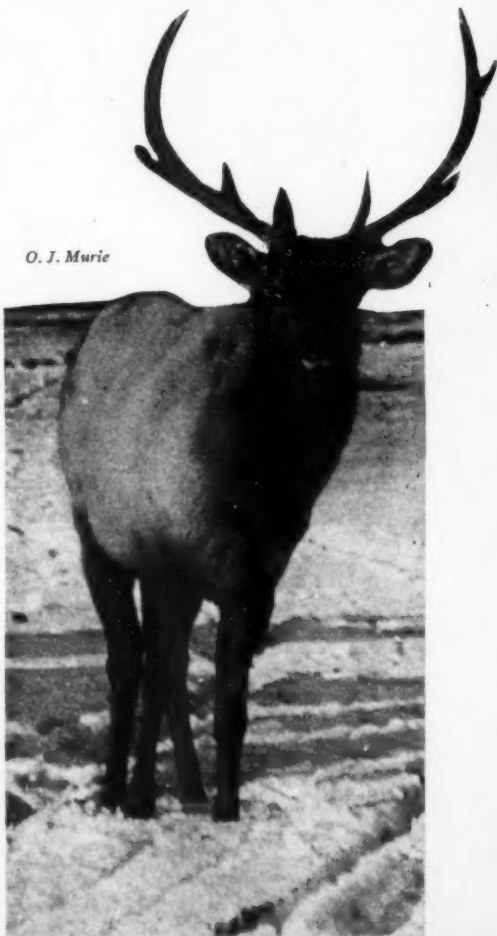
Yet in the very heart or core of this inspiring remnant of the past, was trouble. The kind of trouble that has posed unsolved problems for the last forty years between naturalists, sportsmen, stockmen, government agencies and the out-and-out-sentimentalists. For when man once fingers the delicate scales of na-

ture's wildlife, man and beast each pay the penalty.

The life story of the elk reads like that of any one of a dozen vanishing species that can be lifted from the pages of American history. The wapiti, unlike the passenger pigeon or the buffalo, not only survived the slaughter of primitive times but made a remarkable comeback through federal and state aid, until the question now posed, is, "What to do with them for the amount of range and feed available?"

For there is not nearly enough winter range or food for the great numbers of big game which include deer and moose in the Jackson Hole region. This region, which is one of the hottest controversial spots in the United States because of the

O. J. Murie



IDAHO
WYOMING

YELLOWSTONE NATIONAL PARK

Grand Teton National Park

Jackson Lake

BUFFALO FORK

FOREST

NATIONAL

GROS VENTRE R.

National
Elk Refuge

Jackson

Snake River

TETON

HOBACK RIVER



Robt.
Seibert

ALMER P. NELSON has capably managed the government elk refuge for the past 24 years. "Almer," as he is affectionately known throughout Teton County and most of Wyoming, has built the refuge from its original 2200 acres to its present status and productivity of 25,000 acres. He has lived and studied wildlife conditions his entire life and is an authority on elk history in Jackson Hole

He knows to an hour when snow conditions are such that artificial hay feeding should commence in winter. He can tell by the general appearance or "look" of an animal whether it is sick, hungry or just ornery. On the sill of a large picture window of his home, which frames a magnificent view of the Tetons and refuge feeding grounds, he keeps a pair of binoculars. These are his "key" and are used constantly for any unusual signs among the herd.

He also keeps tab on the trumpeter swans which are a by-experiment of the refuge, two pairs having been transferred several years ago from Red Rock Lakes Swan Refuge in Montana. Elk, swans, sage grouse and mountain sheep are as much a part of the man's nature and character as his smiling eyes and hearty laugh.

MAP shows scene of the migration of the elk which begins in late autumn from the headwaters of the Snake River and timbered slopes of the Gros Ventre. Thousands upon thousands of animals move at this time of year, mostly in cover of night, to find food and shelter at the National Elk Refuge at Jackson. This herd is the largest concentration of elk in the world.

Once the Wapiti ranged freely over most of the United States and parts of Canada, and their number was estimated at figures in the millions in the days of Lewis and Clarke. During the progress of civilization these figures dwindled and in some areas the elk were completely wiped out. Finally certain areas were restocked, and the animals have increased in states like Wyoming, Montana, Idaho and Colorado.

Now the question posed in the Jackson Hole area is, "What is to become of the wapiti?" For there is not enough range or food. Map drawn by Robert Seibert.



vast lands donated by John D. Rockefeller to the government for the Jackson Hole Monument (and which to date the State of Wyoming refuses to recognize), is a valley bounded on the north by Yellowstone National Park, on the south by the Hoback River and Snake River Canyon, on the west by the Teton Range, and on the east by the Wind River and Gros Ventre ranges; and is one of the most inaccessible valleys in the Rocky Mountains.

The town of Jackson is at an altitude of 6200 feet. Summers are vividly brief and usually dry. Winters are long, cold and picturesque. This rugged stage is the present habitat of the Wyoming elk.

The Wyoming wapiti was once a plains animal, more or less, and wintered in the semi-deserts of the state with the buffalo and the antelope. but the encroachment of man gradually drove the wild elk to forage for food in the high mountains. In summer, this worked no great hardship on the grass-feeders. But when the deep snows swirled and piled the slopes in drifts five feet deep, the animals could not paw for food easily.

Thousands starved each winter. Thousands more came down into the Jackson

THE National Elk Refuge is a giant farm gaged to feed about 7000 elk. Counts of winter elk population in the valley made over a period of years by airplane in the hills, and sleighs and teams on the feeding grounds of the refuge, show that the Jackson Hole herd is on the increase to such a dangerous extent as to be incompatible with the constant decrease of natural forage. Hence, haying, from plowing to harvest, is the major occupation on the cultivated and irrigated ranch acres. Farm equipment includes 8 tractors, 3 pick-up baling machines, 3 side delivery hayrakes and 3 power mowing machines; and a staff of 7 permanent men and 12 additional seasonal men. Approximately 65,000 bales of hay have been stored in the sheds towards the coming winter and early spring season.

Photograph by Fish and Wildlife Service

Hole valley and ate the ranchers' hay. For a number of years it was a toss-up whether the ranchers or the elk would control the valley. Finally, pressure was brought to bear by local residents and conservation-minded officials, and in 1910, "rightly or wrongly," states a recent issue of *Wyoming Wild Life*, (official organ of the Wyoming Game and Fish Commission), "it was decided to succor the elk by feeding them on a grand scale." Congress appropriated \$20,000 in 1911 and \$45,000 in 1912 for the establishment of a National Elk Refuge in Jackson Hole, under administration of the U. S. Biological Survey, now known as the Fish and Wildlife Service.

Soon the canny elk realized that here was something pretty good. Stags, cows and calves came in by the thousands from the surrounding mountain ranges. The refuge could not begin to care for all the hungry on its 2200 acre ranch. Then began an expansion program until today the acreage of the government home of the noble North American stag

covers approximately 25,000 acres. And now, not even this vast acreage seems big enough to feed the hordes that come down the migration trails each autumn to be guests of Uncle Sam. Worse still, many elk form the habit of remaining in this protected area throughout the entire year, and thus deplete the natural grass food which should be reserved for the winter months.

Finally, in the winters of 1943 and 1944, it was necessary to open part of the refuge to hunting. As *Wyoming Wild Life* has stated, "The state was confronted with the spectacle of killing elk on the same refuge that had been created for their protection." The town-folk of Jackson were horrified, sportsmen throughout the nation registered protests, and dyed-in-the-wood sentimentalists spoke of the barbarism to dumb animals.

Yet as a matter of cold grim survival of the entire herd, the killing was a mercy slaying. But even the blood stains of mercy slayings are not easily erased





from the public mind. Today, the Fish and Wildlife Service has set the absolute carrying capacity of the refuge at 7000 animals.

The "hay burners," as the elk are called by the staff of men on the refuge payroll, require at least eight pounds of hay per animal, per day, during the months of artificial feeding. During the past winter and spring, about 1650 tons of alfalfa and other hay-producing plants were eaten. That does not, of course, include the native standing grasses on the

refuge, which the elk graze before and after the artificial feeding period.

The refuge is operated as a large scale ranch industry. Approximately eight men are employed as irrigators and hay harvesters, and in winter, to feed the elk twice daily. About 2700 acres of this primitively wild country is under irrigation. The remainder of the huge ranch is left in its native state of sage and rabbit-brush, where not only the wapiti and his family make their home, but also the sage grouse, the sandhill crane,

the rare trumpeter swan, long-billed curlews, and many species of ducks; also coyotes, moose, badger, mule deer and beaver. Occasionally mountain sheep wander down from the wilderness areas of the Gros Ventre range to mingle briefly with the elk and the deer on the buttes in refuge headquarters.

At one time there were flocks of sharp-tailed grouse in the spectacular wild and lonely country. But with the heavy concentrations of elk each winter the home-range-pantry of willow bottoms and aspens have gradually become, like Mother Hubbard's cupboard, quite bare. As a result the grouse have disappeared.

Although the elk begin their home-comings at the first heavy snowfall, artificial feeding of hay does not commence until the natural grasses standing on the ground have been well pastured, or snow is such that grass-eaters cannot paw through the crust.

Mr. Nelson, who has lived with elk so many years that he can bugle like one, knows almost to an hour when artificial feeding should begin. He says, "The elk, like any wild animal, is healthier when rustling for his own food. When the animals concentrate in large numbers on the feeding grounds and are fed hay over a long period of time, a disease known as necrotic stomatitis sometimes becomes prevalent. So working for their own meals is much more wholesome for the animals."

Twice each day, after the artificial feeding begins, five teams and five bobsleighs cover the feeding grounds of the refuge. From the highways entering the town of Jackson, the refuge presents the appearance of a mammoth stockyards with handsome antlered stags, usually congregated together, and the cows and calves in little circles of their own. This wildlife scene, which cannot be duplicated anywhere else in the world, has become quite a tourist industry. Hotels are jammed and restaurants are crowded. During winter weekends, when skiing is

a major attraction, the elk vie in popularity. Visitors are permitted to ride the hay-sleighs while the elk are being fed. They are also allowed to photograph the animals. But visitors are not allowed to get off the sleighs or walk among the wapiti, because of the possible danger of a stampede.

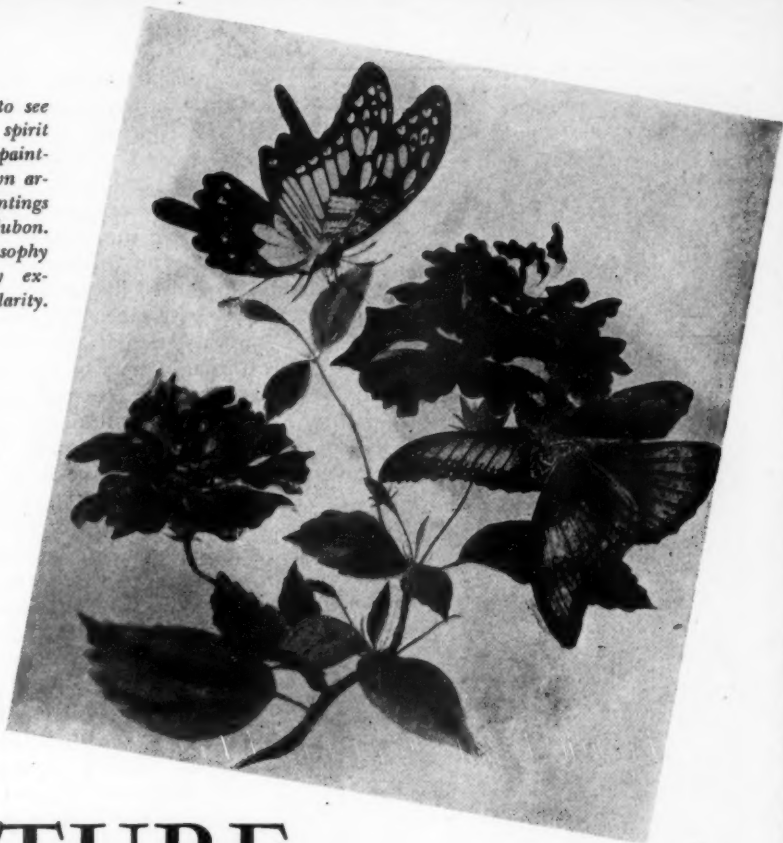
It is amazing how quickly those wild big-game mammals know that they are "at home." They will follow the hay sleds closely, even coming to the sleighs to be hand-fed wisps of hay by gleeful tourists. The photogenic bulls seem indifferent to cameras. Some wear bored expressions. Yet these same handsome, fawn-coated fellows, and these same dun-colored cows and their squealing calves were part of the cautious, timid, man-shy band that came down from the mountains in November.

But come late April or early May, when the dangers of blizzards are past, these same beautiful animals will revert to their wild state, breaking up into small bands and departing for their summer homes high in the wilderness back country. Then again will they go their secret, seldom-seen paths. The cows will birth their calves in mid-May or June in some remote aspen grove or brush of sage. Once again will their hearts grow wild. And in golden September the bulls will bugle their unforgettable call that they are the most noble stags in all of North America.

Then at the first heavy snowfall in autumn, the instinctive urge of self preservation will start the elk on migratory trails leading across the Buffalo and the Snake Rivers to the National Elk Refuge at Jackson, Wyoming. The mountain slopes will come alive with thousands of bulls and cows and squealing calves in the purple dusks.

And amid this inspiring, thrilling picture of the Old West, one cannot help but wistfully speculate as to the fate of this magnificently primitive remnant of an earlier day.

It is remarkable to see the similarity in spirit between this Ming painting by an unknown artist and the paintings of John James Audubon. A common philosophy of naturism may explain the similarity.



NATURE

in Chinese Thought

By Alan Devoe

WITHIN the last few years, by the circumstances of war, we have been brought with a new closeness into contact with the ancient country and ancient culture of China. It is a meeting that must please a great many of us, for many reasons. But especially should it give a deep pleasure to those of us who are particularly concerned with nature. For China is the most nature-close country in the world. Chinese philosophy,

Chinese painting, Chinese attitudes toward everything from how a dooryard garden should be landscaped to how a wise man should confront the enormous questions of deity and death . . . all are the product of a nature-devotion that for millenniums has been central and all-governing in the Chinese spirit. When Dr. Lin Yutang searched American literature to find a writer whose work might show a point of view most nearly



The Chinese feeling for nature's rhythmic vitality is well indicated by these paintings of carp by Fan Yung Ch'uan of Hopei.

like the traditional Chinese point of view, the writer he chose was Henry David Thoreau.

The land and people of China are very old, possibly the oldest in the world. China's history stretches back and disappears in the mists of pre-history. It is at least an admissible scientific guess that indeed the beginning of human life may have taken place somewhere in the great Oriental territory that is now China. It may be on this account—this tremendous continuum of history going back to our human dawn-day in the morning of the world—that the Chinese attitude holds in it so much of what must have been the attitude of the very early men of earth, waking to the wonder of the extraordinary cosmos into which they had been inscrutably introduced as a part of the infinite Process that flings up also badgers and millipedes and mountains and weathers and constellations.

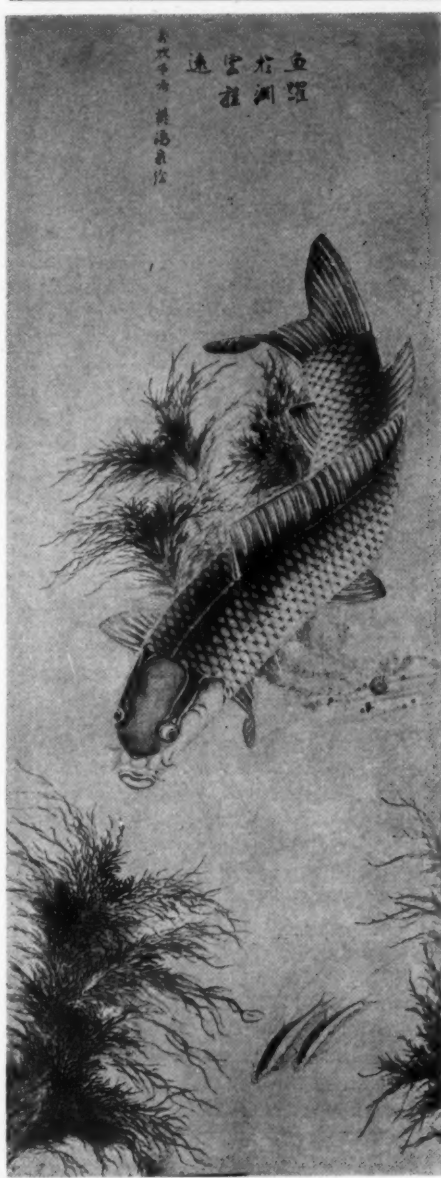
To aboriginal man, there is presented a universe in which almost everything happens without his agency. Storms arise and disappear, animals and birds and vegetations are born and die, the sun swings up and the sun swings down, and all this multifarious eventfulness is not of his doing. He postulates, as by a spontaneous necessity of the mind, a Great Power; and he feels very tiny, very awed, very homagelike, being insistently reminded of how utterly dependent he is, in every instant, upon that Great Power even for the primary fact of being, and for all else.

This way of looking at things—this awareness of the smallness and creatureliness of man, and of the boundlessness of That Which operates the creation, time without end, in everlasting cycles of rhythm and recurrence—became the Chinese viewpoint back before history began, and has been preserved throughout the development of Chinese culture as its essential theme and philosophical animation. The power personified as Nature is of an infinite power and per-

fection; that creature of Nature which we call man is only one creature among many other creatures, one manifestation among innumerable other manifestations of Nature. This being so, the smallness of man so very small, the greatness of Nature so immeasurably great, man is to find his right way of life not in a straining and sweatful effort to impose his tiny will *upon* the patterns and performances of nature, but rather in as graceful and skillful and essentially reverent as possible an accommodation of himself *to* the course of natural process and tendency.

It is given to most of the creatures of earth—the animals and fish and frogs and butterflies—to have only a very little exercise of intellect and choice. They are accommodated to nature willy-nilly, because they are altogether a part of nature, carried wholly in the stream of her activity. To men, however, it is given to have a certain degree of self-conscious reason, so that they may (puffing themselves up with pride and forgetting their littleness and fallibility) fancy themselves rulers and arbiters; or so that, on the other hand, they may (contemplating that infinite power which we call Nature and which is forever, and reminding themselves that they are only one minor ingredient in its processes, as fish also are, or crickets) choose to humble themselves and seek to live fitly by an acquiescence and consent. It is the second of these courses that has ever recommended itself to the philosophers of China, from the earliest days; and it is this inveterate sense of the contrasted purity and power of nature, with the littleness and waywardness of man, that has pervaded all their thought and art.

We commonly associate with Chinese culture the name of Confucius. This is right enough; but Confucius is the spokesman for only one aspect of Chinese thinking: the codification of behavior and manners and ethics, the "ceremoniousness" which makes the practical conduct of life a smoother and



The balancing panels suggest the ideal integration of all lives into the swirl and sweep of The One a philosophy expressed in paintings.



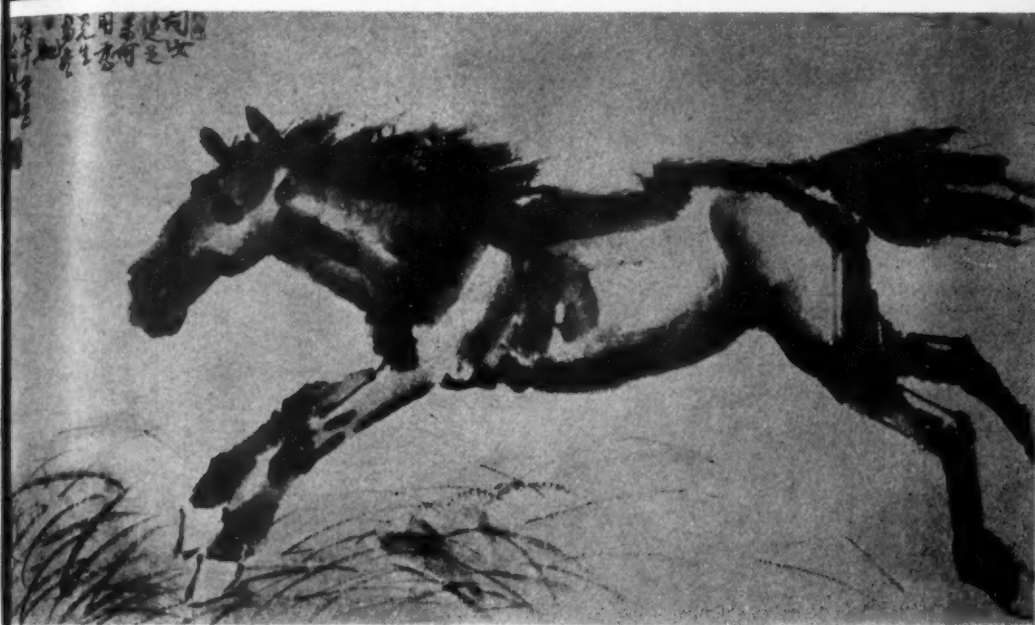
In the animistic view of the Chinese, every created thing has a certain degree of consciousness and life-experience, however different from ours. Even bamboo-stalks "come alive," in this depiction by the artist Lo Pin.

more manageable thing. Similarly, we may commonly think of Buddhism as greatly influential in Chinese culture. So it has been; but it was relatively a late importation into China, and it early underwent extensive adaptations to a typically Chinese form.

Deep down below the ceremoniousness of Confucianism, deeper than the special accretions of Chinese Buddhism, there is the immemorial naturism that is the profound and perennial basis of them all. It found its greatest exponent in the person, some six hundred years before the birth of Christ, of Lao-Tzu. This was that sage, commonly known as The Venerable Philosopher, or, with a typically Chinese reverent humorousness, as the Old Boy, who became so thoroughly wearied of the artificialities and pomposities and shallow pretentiousness of "civilized" life that he disappeared into the remote mountain fastnesses to take up a life of eremitical contemplation of nature and meditation thereon. He wrote the *Tao-Teh-King* . . . a cryptic handbook for all who would follow Tao.

There is no quite satisfactory translation for "Tao;" but it means both "Nature" and "The Way." For Lao-Tzu, as for every Chinese, nature *was* The Way. As a distinguished modern Chinese has recently said, "Some of us are Confucianists and some of us are Buddhists. There are capitalists among us and also communists. But *all* of us are Taoists." The love of Tao is the love of nature: the love of nature in her free, wild, aboriginal and humanly unmolested estate—as Henry David Thoreau loved her—and it is the wish to fit ourselves harmoniously, as in an act of religious devotion, to the currents and patterns and melody that mark the going forward of her endless process of rhythmic vitality.

In so far as Taoism may be said to have a single central principle (for it is a philosophy too intelligently fluid to have a mathematical structure), this is the doctrine of *wu-wei*. It is a doctrine



In swift, rhythmic strokes, a contemporary Chinese painter, Peon Ju, strives to capture not only the look of a horse but something of the animal's moving-with-nature fluidity and suppleness.

of quietness and passivity, a doctrine of non-resistance. But it is by no means to be equated with mere non-action, like the doctrines of those philosophers who seek an escape from the difficulties of life simply into nothingness. What it urges is that we "conquer" nature not by struggling against her, or seeking to change her to our will, or attempting to assert ourselves in exhausting and foredoomed struggles to make ourselves more important than we are, but rather by shaping our actions to her greater actions, our current to her current, our wills to the ordainments of that Great Will which must always in any case be triumphant.

In nature, for instance, there is perpetual change. Change is inevitable. So a wise man does not struggle to establish, in his own life, a quality of permanency. Nature does not carry out her processes in stiff straight lines and

rigid angles. So why should we struggle to plant all our trees in straight rows, and to barber our gardens into a toil-some symmetry? Let us be as free of "staticness" as the rest of nature is. If it is the will of the north wind to twist the pine tree in our garden, well, let the tree be twisted, and let us rejoice in the beautiful and natural irregularity that results and that is the shaping of nature's own hand.

It is not the teaching of Chinese naturism that we are never to touch or direct the course of natural events. But we are to do so only in such a way that our action will go *with* the course nature is following, and will not be an intrusion



In a characteristic Sung landscape, by Tung Pei-Yuan, the human element is subordinated to the majesty of nature as a whole, and the house is fitted into the towering landscape as only one small ingredient, dwarfed by the hills. The painting on this page and the one on page 358 are reproduced from THE CHINESE EYE, by Chiang Lee (Frederick A. Stokes Company). Those on pages 355, 356 and 357 are from NATURE IN CHINESE ART, by Arthur de Carle Sowerby, and the galloping horse on page 359 is from MY COUNTRY AND MY PEOPLE, by Lin Yutang (Both books are published by the John Day Co. of New York City.)

into it or an interference athwart it. When we build our house against the hill, let the lines have the curve of the hill. When we lay out our garden, let the trees be planted where (so to speak) they "want" to be planted, as their species and the look of the landscape may naturally dictate. When we build a road, let it be no great brutal scar imposed across the face of the earth as a proud pretense of our power; but let it run flowingly with the natural contours of the land, as a kind of contribution to them, a kind of little compliment that we can make. The old saying, "Nature knows best," has been much cheapened by frivolous use. In its deepest sense, however, it expresses the philosophy and the secret which in Chinese culture have been carried to extremes of the subtlest refinement.

In Chinese paintings, it is rare that any human figure occupies a prominent place. Instead, all the emphasis is on soaring mountains, on wild ducks on the river, on the sweep and swirl of snow, on things like that. Where man enters into the landscape, he generally enters as a tiny figure in the most inconspicuous cranny of the scene. He is no more important than the birds, the animals, or the hills; he is of no greater consequence than any of the other countless manifestations of the Great Power that conceives them all.

Indeed, in the Chinese view, there is a deep sense in which he is the least deserving of all things for depiction. Chiang Yee has said: "We love natural truth; our philosophers have become convinced that human desire has grown monstrous; man in his eagerness to grasp it gives birth to much unnatural and untruthful behaviour. Man, we think, is no higher in the scale of things than any other kind of matter that comes into being; rather, he has tended to falsify his original nature, and for that reason we prefer those things that live by instinct or natural compulsion; they are at

least true to the purpose for which they were created."

The mind of China is forever a nature-mind. It cherishes the natural world *just as it is*; and finds the right intention of art and philosophy, of all the effort of human life, to consist in a deepening rather of our receptiveness and appreciation than in an exercise of our will to conquer and change. We are surrounded, the Chinese think, with a natural world full of wonder and loveliness; and it is better to contemplate, with the enchanted eyes of a child, the way a bird looks on a willow branch, than to chop down the willow with the latest jet-propelled buzz-saw.

If nature has planted the hilltop with hemlocks, we are to think twice before we slash a road through them, to no matter what metropolitan center of "progress" we imagine the road is going to lead. We are to weigh those values which inhere in a hemlock grove and which cannot be reckoned in a ledger—those scents, those quietnesses, those murmurings of the wind, those intimations of That Which "rolls through all things" and is the ultimate source and sustenance of us all.

We are not to make the fatal mistake of ever imagining that we are masters. We are not masters. We are creatures. And we are only one of very many, from the fellowly star shining in the far sky to the fellowly mouse squeaking in our wainscot. There is a happiness in humility. There is an endless strength when (in the words of John Muir, that Tao-minded westerner) we "lie back upon nature" and hush our hearts.

The nature-philosophy of China, like every other philosophy, can lead to undesirable extremes and abuses. It can lead, at its worst, to a kind of indolent fatalism that is nearly a paralysis. But at its best—and its best has been uttered again and again by China's painters and poets and philosophers—it brings an unequaled treasure.



McATEE

*Food Analyst
of the Birds*

By John K. Terres

I FIRST saw W. L. McAtee at the North American Wildlife Conference in 1936. The center of a small group of men, he stood quietly, legs spread apart, his head bent forward in an attitude of intense listening. He wasn't a big man, perhaps of medium height, but heavy-jawed and powerfully built. He might have been a football player or a coach.

"Who's that?" I asked.

"That?" replied the stranger, "Is W. L. McAtee—bird food habits expert."

"Looks more like a wrestler." I ventured.

The stranger snorted, then grinned. "I guess he's probably wrestled with more bird's stomachs than any other man alive. And one of the best biologists in the country," he added.

I have never met a biologist who disagreed with the stranger's appraisal of McAtee—except one. This man is Edward A. Preble, who rates McAtee even higher. Preble, himself one of America's

great naturalists, said recently: "Mac is better informed, on more groups of organisms, than any man in the history of the Bureau of Biological Survey or its successor the Fish and Wildlife Service. In breadth of knowledge, he even surpasses C. Hart Merriam, the versatile naturalist who established the Bureau."

McAtee is not only an able economic ornithologist but a broadly informed entomologist. He is one of the taxonomists who recognized the value of using the genitalia of insects for identification and applied the method to groups in which it had hitherto been untried.

But if he knows birds and insects, McAtee also has known in turn fishes, plants, mammals, reptiles and amphibians. Early in his career he studied the fishes of the Potomac River near Plummer Island and with A. C. Weed, wrote an interesting report of their findings.

Few scientists combine their talents with good writing. McAtee's scientific papers number more than 750, besides his many literary essays, some poetry and many reviews.

It is probable that McAtee's bird-stomach examinations and his subsequent writing did more for bird conservation than anything else in his career. They aroused wide-spread sympathy for bird protection. For the first time, people became generally aware of the role of song and game birds as destroyers of insects.

From 1908 to 1941, McAtee did field work for the Biological Survey that took him to 40 States, 2 Canadian provinces and 12 European countries. His earlier field work specialized in the food habits of waterfowl, there being a great demand for information on planting to attract these birds. His field studies of water plants, his collection of ducks and geese, and his stimulating drive to get bird stomachs, produced material so extensive that some of it could not be completely analyzed for years afterward.

McAtee's fame may rest on his bird food habits work but his greatest claim

to posterity may yet come from a little-known and provocative book he has written that still awaits a publisher. It is "A Critique of Darwinism," a boldly original work that criticizes the natural selection hypotheses of Darwin and his disciples. McAtee's views on this subject, expressed in previously published papers, aroused a storm of protest from natural selection theorists, both in this country and abroad. His work is based largely on the food habits of birds as evidenced by 80,000 stomach examinations of the Bureau of Biological Survey, now the Fish and Wildlife Service.

In his stomach analyses, he found that birds frequently ate protectively-colored insects. Some of these insects, according to extreme proponents of protective coloration, shouldn't have been eaten at all! This interested him so much that he gave the problem increasing study, leading to a consideration of the theory of natural selection in general. One of his longest papers, presenting his evidence against the natural selection theory, was published in the Smithsonian Miscellaneous Collections for 1932. It was titled, "Effectiveness in Nature of the So-called Protective Adaptations in the Animal Kingdom, Chiefly as Illustrated by the Food Habits of Nearctic Birds."

Waldo Lee McAtee was born January 21, 1883 in the village of Jalapa, in Grant County, Indiana. His parents were Scotch and English and from them he may have inherited his stubborn persistence and disposition to fight for his concepts of truth and justice.

As a youth, McAtee was athletic. He was good at running and jumping, and a tireless walker. But he was also an excellent student. In high school, he took all the science available, principally physics, chemistry and botany. His first published article was written when he was only sixteen. It appeared in the Marion, Indiana, *High School Journal* for 1899 and was a review of a bird food habits paper by W. B. Barrows, a nationally known American naturalist.

Young McAtee's article foreshadowed his future in economic ornithology.

At college, McAtee planned to major in chemistry. But upon reaching the campus of Indiana University, he found the chemical laboratories destroyed by fire. Thus diverted, he entered the zoology department, headed then by Dr. C. H. Eigenmann, one of the leading zoologists of his time. Eigenmann was an ichthyologist and under his tutelage, McAtee did considerable work on fishes, even describing new species.

His decision to become a federal biologist was inspired by none other than the late Dr. Frank M. Chapman. When McAtee was in his junior college year, he knew so much about birds that he was instructing a class there in ornithology. One day, Dr. Chapman visited Indiana University. He lectured the class on birds and then took the class on a field trip. It was a great event for McAtee, influencing the future course of his life. Dr. Chapman had convinced both him and his teachers that ornithology was a respectable pursuit and had possibilities as a career.

During the summer of 1903, between his junior and senior years, young McAtee went to Washington, D. C., for a tryout with the Biological Survey. His work that first summer was largely bird stomach examinations. His apprenticeship was successful for just before graduating, he received an appointment to a job with the Biological Survey.

During the twenty years before McAtee's appointment, some important food habits work had already been done by men in the Biological Survey, despite the meager funds upon which that Bureau was forced to subsist. Dr. A. K. Fisher had examined several thousand hawks' and owls' stomachs, sufficient to publish his famous bulletin on the food habits of these much persecuted birds. W. B. Barrows had written his food habits bulletin on the English sparrow. But most of the Bureau's efforts had been concentrated on the classification

and the geographic distribution of birds.

When McAtee came to the Bureau as an apprentice in 1903, there were only two men doing food habits work. Old-fashioned dissecting microscopes were used and a great deal of the work was done with hand lenses. A sink, to which the worker had to walk at frequent need, was against one wall of the room. There was a single crude laboratory table, and several desks, often accommodating people not members of the section. The messengers worked in the same office. Used as a general junk room, it was known as the "gut shop."

It was here that McAtee met Professor F. E. L. Beal, the man he most wanted to meet and work with. The honest and vigorously-spoken Beal had much to do with forming not only McAtee's scientific, but also his human, philosophy. Often in later years McAtee found himself saying, "Professor Beal used to say . . ."

Beal was an indefatigable worker who kept his eyes to the microscope more hours each day and for more days than anyone McAtee has ever known. Beal's record of examining 37,000 bird stomachs probably will never be surpassed.

Dr. C. Hart Merriam was then Chief of the Bureau of Biological Survey. Other members with whom McAtee was closely associated were Dr. Judd, the brilliant author of "Birds of a Maryland Farm," Dr. A. K. Fisher and the scholarly Henry W. Henshaw who succeeded Merriam to become the second Chief and Editor of the Bureau. It was Henshaw's suave but searching criticisms of his early writings that encouraged McAtee to devote himself diligently to becoming a good writer.

The first considerable job that McAtee tackled to lessen confusion in the food habits work was to transfer the S. A. Forbes collection of more than 6,000 bird stomach contents to standard vials and label them. Up to then, this valuable collection had remained as received and was unavailable. From it, McAtee

got a ten per cent increase in the stomach contents of horned larks, the first group he was assigned to study.

Later, he set up a filing system for both examined and unexamined stomach contents, so that re-examinations, often necessary, were easily done. He also installed a two-card index file for bird food items, so that questions of which birds were known to eat certain foods could be answered quickly. This file became the underlying basis for the Survey's recommendations on planting to attract waterfowl and upland species.

In all this reorganization, McAtee could have done little without the assistance of Dr. A. K. Fisher, then Assistant Chief of the Bureau, who eased difficulties regardless of red tape.

As the food habits work grew, the Bureau of Entomology could not find time to identify the many insect remains found in bird stomachs. McAtee then urged the hiring of a specialist. Dr. Fisher approved and the Survey hired its first entomologist, J. Douglas Hood, an expert in beetle identification. Later, two other entomologists were added to the staff.

Meanwhile McAtee had become a good entomologist himself, competent in naming at least three orders of insects. For many years the food-habits staff collected insects on week-ends and even during vacations. And so the reference collections grew. Besides entomologists, two botanists were added to help keep the seed and plant identifications going.

Those were the glorious days of food habits research. Bird stomach analyses, of difficult groups including the night-hawks, whip-poor-wills, swifts and road-runners, could have been done only with the services of a staff equally as large and diversely qualified. McAtee has often regretted his inability to bring his food habits studies of these birds up to date, for they are highly interesting. Some nighthawk's stomachs held identifiable remains of 50 species of insects. The swifts, taking smaller kinds, were

almost as inclusive in their feeding. The chuck-will's-widow, previously known to be only slightly so, was definitely proved to be a regular *bird* eater! One interesting by-product of McAtee's stomach examinations was a greater knowledge of an obscure, but interesting phenomenon—the shedding of the gizzard lining by birds. McAtee's principal paper on the subject appeared in the *Auk* for 1917.

In 1905, two years after McAtee came to Washington, he became a member of the Washington Biologist's Field Club, with headquarters on lovely Plummer Island, Maryland, in the Potomac River. A great advantage of this Club was informal association with many specialists in various branches of natural history.

One of them, Charles Fay Wheeler, was the most erudite botanist McAtee ever knew, and from him he learned the way to identify plant fibers and seed fragments under the microscope. E. A. Schwarz, the leading beetle expert of that time, also taught McAtee, along with A. K. Fisher who specialized in birds, other vertebrates, and woody plants. Other visitors and members of the Club were herpetologists, foresters, and mammalogists, many of whom enriched McAtee's knowledge.

As a youth, McAtee was so full of latent energy that for relief he often picked up stones and hurled them into space or gave a wild yell or shriek. One day, Dr. Fisher, McAtee and others were on a field trip. As they passed a grove of red cedars, McAtee suddenly gave a wild macaw scream, which caused a poor frightened barn owl to fall out of a tree and fly off in bewilderment.

In later years, while on a bird trip with E. A. Preble, McAtee once uttered his terrifying cry with profit. One day at noon, when birds were quiet and they needed additional species for the list, McAtee suddenly gave his ear-splitting screech near a clump of red cedars. A terrified barred owl erupted from the cedars and the excitement attracted a

Cooper's hawk, thus yielding two hard-to-get species for one squawk.

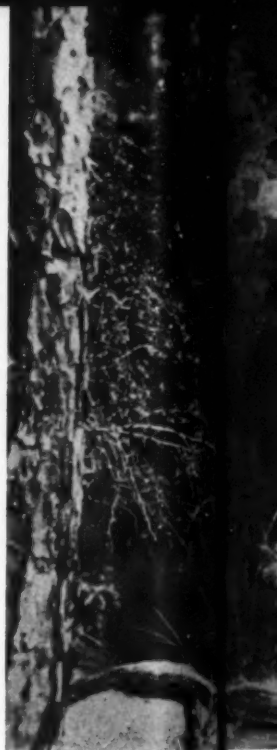
McAtee says of his ability to imitate bird calls: "I was no great imitator of bird notes, but I have had a quail come and peck on my boots in response to the rally call given more and more softly; had a Cooper's hawk fly almost into my face, and a screech owl knock my cap off after uttering mouselike squeaks. Best of these experiences was in seeing a tufted titmouse perch on Preble's hand in response to his squeaking. How unerringly birds come to the source of sound! . . ."

With so many specialists among members and guests of the Washington Biologist's Field Club, the fauna and flora of Plummer Island and nearby Potomac shores were perhaps more intensively observed and collected than any other in the land. The intensive collecting revealed many interesting facts. The ranges of some creatures were extended far beyond the limits known for them before. A bug was found that had previously been known from no nearer locality than Texas, a weevil from Florida and a fly from Mexico. Numerous undescribed insects were collected and even a few undescribed mammals.

Although later in his career he traveled widely, for 39 years McAtee observed birds and collected plants and insects, off and on, within a radius of 25 miles of Washington. So thorough was his coverage that in later years, though traveling by automobile, he seldom reached a place where he had not previously been on foot. Each spring and Christmas, for many years, there was a daylight-to-dark bird trip on foot in company with E. A. Preble and Alexander Wetmore. One day McAtee and Preble covered 32 miles, by the map.

One of the most satisfying of his many field investigations gave him a victory over the U. S. Army Engineers. About 1926, complaints had arisen over the destruction of wildfowl food plants in

W. L. McAtee
with
Herbert L. Stoddard
in the field,
in Florida.



Currituck Sound, North Carolina, and Back Bay, Virginia. People in the region claimed the damage was caused by swans and coots and they made the usual pleas for increased killing of these birds.

McAtee made several trips to the region and recognized the depletion of wildfowl food plants as being due to pollution by salt water. The source of the salt water was Norfolk Harbor, and it was coming through the Chesapeake and Albemarle Canal operated by the Army Engineers. In a hearing before the Rivers and Harbors Committee of Congress, held in Washington, D. C., in 1930, McAtee's skill in controversy and his devastating facts won the battle. Lindsay C. Warren of North Carolina, then Chairman of the Committee, told McAtee afterward, "This is the only time I ever knew the Army Engineers to be licked and you're the one who did it!"



When the Cooperative Quail Investigation in Georgia was organized in 1924, E. W. Nelson, then Chief of the Biological Survey said to McAtee: "I'm going to give this to you because you have a reputation for getting things done!" But McAtee modestly ascribes the great success of that work primarily to the personality and ability of its leader in the field, Herbert L. Stoddard.

Besides his ability in so many fields of natural history, McAtee has an extraordinary memory. Dr. Ira N. Gabrielson, recently retired director of the Fish and Wildlife Service, says McAtee is not only the most versatile biologist he has ever known, but is possessed of an unusually retentive mind.

When Dr. Gabrielson came with the Biological Survey in 1915, McAtee was in charge of food habits investigations of birds. Gabrielson says that McAtee's

prodigious memory enabled him to identify at a glance a broken bit of wing cover or a piece of an insect leg. His equally prompt and phenomenal knowledge of seeds and fruits was a never-ending source of wonder to the younger men in the laboratory.

More than once, McAtee told Gabrielson the name of a pamphlet and even the page on which he would find some seed or fruit described. To Gabrielson's amazement, he always found the object of his search exactly at the page and place indicated!

In later years, it was inevitable that McAtee should do considerable editing because of his long writing experience. In 1934, with the reorganization of the Biological Survey, he became a Technical Adviser to the director. From that time on, he edited all technical publications of the Biological Survey and all

publications of the Fish and Wildlife Service during most of World War II. In addition, he edited the first five and one-half volumes of the *Journal of Wildlife Management* and many other books written and published independently by American naturalists and game management specialists. In testifying to the magnitude of McAtee's editing accomplishments, Professor Aldo Leopold said recently: "... I, personally, attempt to cover a small fraction of the literature covered in the *Wildlife Review*, but find it an almost impossible burden. How McAtee contrived to do this job and the *Journal* to boot is more than I can understand. . . ."

Perhaps one of McAtee's least known accomplishments is his ability as an amateur poet. Each Christmas, he sends a privately printed booklet of his accumulating verses, or short essays, to close friends both in America and abroad. He has published articles on folklore and the American dialect.

McAtee favors certain of his writings above others. Of his scientific publications he considers his "Food Habits of the Grosbeaks," (1908), as his best report on a group of birds, and his "Woodpeckers in Relation to Trees and Wood Products," (1911), as his greatest effort in applied economic ornithology. It was these two publications, and his report, "The Horned Larks and Their Relation to Agriculture," published in 1905, that led to his election as Fellow of the American Ornithologists' Union in 1913. Besides his government bulletins, McAtee has written a book on wildfowl food plantings.

McAtee has also served American ornithology as a critic. He has written thousands of abstracts and reviews, principally for the *Auk*, *Wildlife Review* and *Biological Abstracts*, of which he edited a section for a score of years.

It is no secret among McAtee's close friends that his disregard for tact, his readiness to attack tenuously-spun theories and his uncompromising bluntness

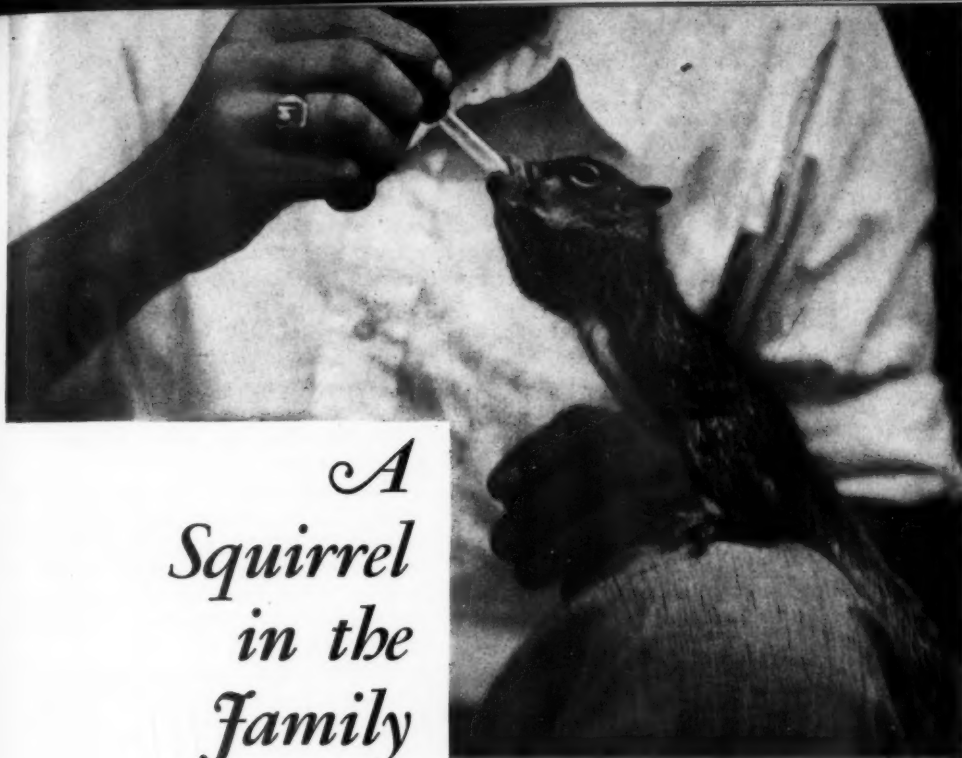
have made him disliked by some people. McAtee hates hypocrisy and has no respect for those who will compromise their views for the sake of personal relations. To him such attitudes are weak; he speaks his mind freely, regardless of the ill-will he may arouse.

But if he has made bitter enemies, he has made equally devout friends. Most of them are fiercely loyal and bear out the belief of many of his old associates that if McAtee has lost by his forthrightness, he has gained much more. Paul L. Errington, a distinguished ecologist and wildlife research man, recently said: "I'd rather have McAtee's Scotch esteem sparingly expressed than generous praise from most other men. . . ."

At 63, McAtee is principally concerned with writing a "Dictionary of Vernacular Names of North American Birds," a work that had its beginning in 1909 when he made a trip to South Carolina, Florida and Louisiana. It was there that McAtee became interested in the local names of birds and plants, which he has collected ever since.

One of his highest honors was a "star" in the 1938 edition of "American Men of Science," published once every five years. The star is awarded 1,000 of the nation's leading scientists, 150 of whom may be zoologists. The votes for the honor are cast by one's peers which makes the honor especially gratifying to the recipient. As another reward for his services to science, McAtee has had one species of plant and 13 species and two genera of insects named for him.

With many productive years still ahead, McAtee has already accomplished more than several men ordinarily achieve in their combined lifetimes. He can dwell with particular satisfaction on a life of unusual service, both to birds and to humanity. By discovering and making public the food habits of birds he has served not only the interests of crop growers and the birds themselves, but of people depending upon our food supplies everywhere.



A Squirrel in the Family

—By Olga F. De Groff

Photograph by W. Bryant Tyrrell

AS we gazed across a horizontal world of uprooted trees on the clear, still morning after the hurricane, we little guessed that the tangle held a secret which was to enliven the next six months for us. Climbing about, the Teen-ager and I noticed a hole in a large willow which lay across our path.

Within we found three tight little balls of gray huddled together. What babies could be new at this time of year, September fourteenth? One tiny head separated itself from the huddle: it was a baby squirrel! More alert than the others, this inquisitive little fellow stuck his nose out of the hole. Without having the vision of a seer, or the wisdom of a Solomon to warn us of what we were doing, we lifted out the little ball of fur and took him to the house.

We placed Little Harry (as we called him) in a deep paper box, covered him with soft cloths, and offered him some

warm milk from a medicine dropper. Harry caught on at once and took to the nourishment with such enthusiasm that he choked. After a little spasm of heaving he returned to the milk. Kneading the dropper with his paws he would suck, choke and heave alternately until the dropper was emptied.

Soon we realized he was noticing things. Moreover, he was stronger on his little legs and didn't fall over when he crawled. His first solid food was a bit of pear. We watched breathlessly as he took it in his paws and balanced it, not between his front pads but between larger ones back of his claws. Apples, cookies, broccoli, Brussels sprouts were added to his menu. Then he graduated to a doll's bottle with nipple, and how he enjoyed it! No baby ever grasped a bottle with better form or finesse than our Harry. No wonder he grew and in the process outgrew his box.

The Teen-ager found an orange crate, put a trap-door at one end, covered one-third of the top with mesh and lined the floor with newspaper and soft cloths. In this our squirrel slept at night in the kitchen.

Harry seemed to prefer climbing on a human to any other activity. We became quite used to the fact that he needed us for tree exercise. It was a common occurrence to go about household duties with Harry tearing around one like the stripes on a barber pole.

On sunny days we took Harry outdoors and put him on a tree isolated from others so he couldn't run away. He loved this and would scoot up and down crazily. Often he settled down into a comfortable position and fell asleep. Then a step-ladder would be in order.



Photographs by Clara L. Rieser

But usually he climbed down to a waiting shoulder.

After he began eating solid foods the instinct came to hide what he didn't need. The first time he took a squash seed and hid it in a shoe, we were thrilled. Never had he seen a squirrel hide food, yet he did it by God-given instinct. His busy paws pulled something only he could see over his cache. After

that we found seeds, prune pits, peanuts, or a stalk of broccoli tucked away almost anywhere: behind the teapot, in a sweater pocket, down the back of our neck (a favorite place), and even in the sprinkled, rolled-up ironing. Once he ventured on a new place and buried a walnut deep in the flour bowl. When he raised his head he looked like the Lone Ranger, except that Harry's mask was white. A new word came into use: *pff*. Using his paws as a brush he *pffed* until his whiskers were free of this tickling thing.

Harry did not like to get wet, and would rub himself along the floor or on us until he felt dry again. He would sit on the window-sill looking out at a pouring rain, chattering his teeth in obvious annoyance. Perhaps he was thinking, "It Happened One Night."

When Harry caught his first glimpse of a squirrel—possibly his own mother—at the window, he was terrified. He squirmed fiercely and tore down inside my sweater where he felt safe.

A squirrel has five claws on his hind feet and four on his front. These points were often felt on arms and legs, but never did Harry attempt to bite any of us in anger, although he would sit on our shoulder chattering furiously over some supposed wrong. He even licked our hands with his pink tongue as a kitten might. Many times we were reminded that we were harboring a rodent, and warned that if it bit us we would have to go to a doctor. Our answer was that this rodent was as fur-bearing as a kitten, and the idea was to so treat him that he wouldn't want to bite us.

He had one bad habit that we weren't able to break. He liked to jump from the kitchen cabinet to the table. The distance was just right, and he negotiated it as often as possible and during the greatest traffic thereabouts. One evening before Christmas we were making Turkish Delight with gelatine. Three pans of the candy, red, green, and lemon, stood side by side on the table, Harry

jumped, and even as he landed in the sticky stuff, he made a reverse flip onto the floor. He was a sight to behold! If ever he *pfed!* he did then. With little paws furiously wiping this mess from his body, he only made matters worse. He disappeared under the cabinet, and when he crawled out on his belly a minute later, not only had his whiskers congealed into one drooping whisker but hanging therefrom was a curtain of dust.

Harry sat on the scales one day to eat a squash seed and we found that he weighed just one pound. We decided the kitchen was becoming too crowded for all concerned. So after breakfast thereafter we took Harry to a large room over the garage where his energy could have freer scope. Everything which might prove tempting to the natural chewing

magazines satisfied his taste better than the "pulp." He was quite through the corners of a year's issue of *National Geographic* before we discovered it. A pile of Western pulps nearby was not touched. This large room was the answer to our problem. In it he could do just about as he wished. The Man of the Family brought in a log five feet high in which there was a deep hole like his original home. There was also a large box of sand in which he made himself a competent bull-dozer.

On New Year's Day we suddenly became aware of a new activity. Harry was circling the room, jumping from object to object until he returned to the spot he had started from. This he kept up for minutes on end until it became distracting to us. With a hopeful expectancy of



instincts of a squirrel was removed from this room. After all, one can't take an animal out of its natural environment and not expect him to follow instincts. Even as we chuckled over his hiding prune pits under the edge of the rug and down our backs, we had to accept philosophically the fact that he would chew things.

It was interesting to note that Harry chose the better magazines for chewing. It finally dawned on us that slick-papered

relief and yet with hearts already feeling the emptiness we dreaded, we waited the coming of Spring.

With warmer weather we took him outdoors to play on some isolated tree. We realized that a complete severance of ties had to be made sometime but were always secretly glad when, on returning to the tree, we found him waiting for us. Twice we found him, though, seemingly frozen to the tree in a sprawled-out position. It may have been the low-flying

planes that had frightened him. Another time, when he was trying to climb down the side of the house from the roof, the momentum became more than he could maneuver, and he fell quite a distance, skinning his leg on the porch rail. We began to condemn ourselves for keeping a little animal from adjusting itself naturally to nature's environment.

On Palm Sunday we took Harry down to the boat-house and put him on the roof in the warm sunshine. When we returned from church, Little Harry had

solved his problem as well as ours. He had gone to become a naturalized denizen of the great outdoors.

We suspect, though we never will be absolutely sure, that one of the group of gray squirrels that breaks daily bread with us might be our Harry, for it, too, has all brown feet as he had, and a similar funny crick in its tail. . . . Wherever he is, we hope that he has not lost the sense of happiness which so brightened our winter. Happy landing, Little Harry, on all eighteen points!

BIRDS *in* CROSSWORD

By Robert P. Allen

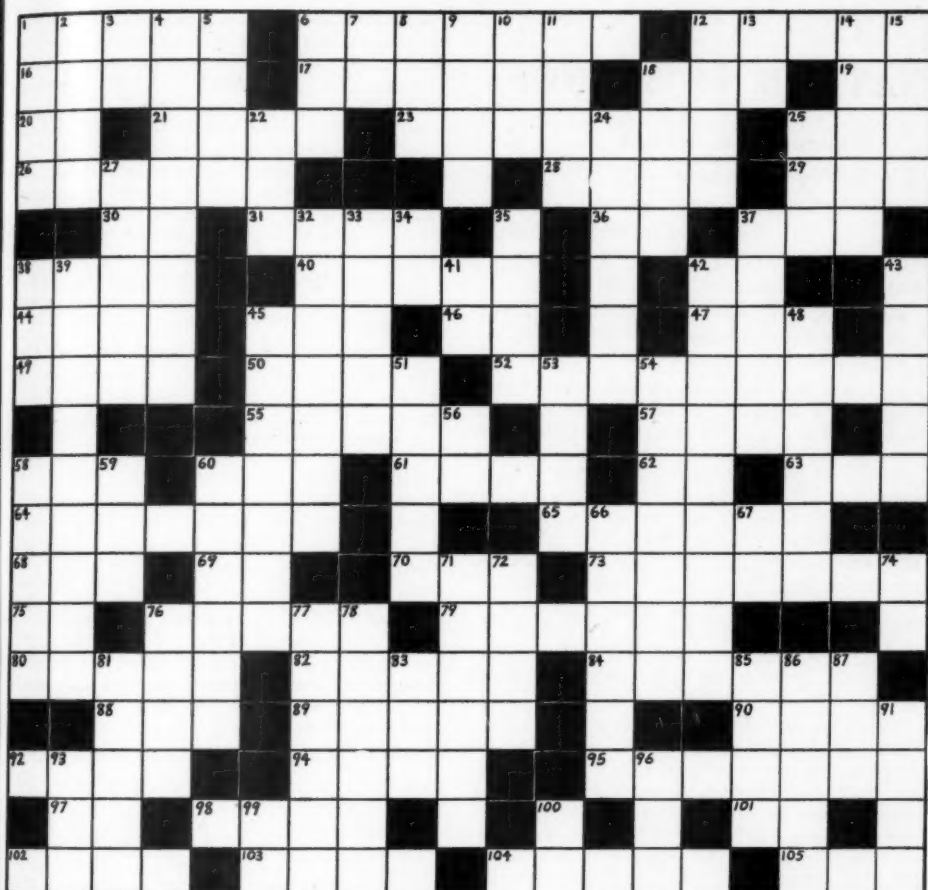
ACROSS

1. The plumes of this bird were worth their weight in gold.
6. He sang in the wilderness.
12. Sable croaker.
16. Look here for coot and heron.
17. Tropical bird.
18. Fly-by-night.
19. Irish writer (pseud.).
20. One nation indivisible.
21. In the West this means water and sometimes ducks.
23. Among other things this brought the terminal moraine.
25. Even this doesn't stop the bird enthusiasts!
26. Pintails to you!
28. Here birds are most abundant.
29. You may feel like this after a May Century Run.
30. When birds are most active (abbr.).
31. A bird of coast and inlet.
36. Form of verb *to be*.
37. Mental nudge.
38. Song of the Hermit Thrush.
40. Best place to look for skimmers.
42. President of U.S. who established first Federal Bird Refuges (abbr.).
44. The residue of erosion.
45. One dove to another.
46. Pronoun.
47. Object or purpose.
49. Cyrano broke all records.
50. Too.
52. Parasite that interested Mr. Darwin.
55. Flame dancer (plural).
57. British for *bird blind*.
58. Theatre sign-of-success (abbr.).
60. In 1890 this was referred to as "limb."
61. Halliburton helped make this island famous.
62. He'll be an A.B. someday (abbr.).
63. Ming —.
64. Late. Maybe later than you think.
65. Look for it in stones. Or churches (singular).
68. Numeral.
69. Negative
70. Bovine of the Northland.
73. One who writes sea ballads.
75. Method of communication (abbr.).
76. Rank.
79. A dance. Can you do it?
80. A fruit that doesn't grow on trees.
82. Author of a State bird book.
84. One of the stigmas of modern living.
88. A bird simply can't do without it!
89. Look for them at night.
90. Negative (slang).
92. Expect this from "48 DOWN."
94. Portent.
95. Sweet singer.

97. Compass direction.
98. It can be good or bad.
101. Thoroughfare (abbr.).
102. One of the grebes.
103. Therefore.
104. President of the N. A. S.
105. What every bird watcher must do.

DOWN

1. Large bird Down Under (plural).
2. What you'll do when you see a roseate spoonbill.
3. Method of transportation (abbr.).
4. Best way to count large flocks.
5. Tough guy who says "boids."
6. What Henry Tudor did with spoonbills.
7. Prefix signifying primitive.
8. Friend of Man.
9. — Duckling.
10. Snake.
11. Or twice!
12. Brief description of ivory-billed woodpecker.
13. Preposition.
14. Some are bald (singular).
15. What you'll be in if there's a Depression.
18. A nestling does this when hungry.
22. Type of vessel (abbr.).
24. What Great Northern Divers sound like . . . to some people.
25. Ornithological group (abbr.).



27. Marsh birds.

32. Study of animals or plants in relation to environment.

33. A congregation of birds.

34. Hemisphere (abbr.).

35. A detail

37. What "I" did for "you" ... according to the song.

38. If you addressed mail to a G.I. you know this (abbr.).

39. On lower reaches of this river look for only becard in U. S.

41. The desert country (abbr.).

42. Amulets.

43. One of the thrushes.

45. Here a legendary court gathered.

(See page 376 for answer)

48. A volcano.

51. Exclamation (two words). You'll use it when you get your copy of AUDUBON MAGAZINE.

53. Water bird abundant in Florida.

54. Philosopher-Naturalist (1817-1862).

56. Where many U. S. birds winter (abbr.).

58. Force eleven on Beaufort Scale.

59. State (abbr.).

60. Birds use bark fiber, leaves and grass for this.

66. Shun.

67. Hospital term for maternity case (abbr.).

71. Woodpeckers are saving of them.

72. State (abbr.).

74. Verb.

76. Solution to the men's clothing shortage.

77. One of the yellow-legs.

78. What most animals are doing most of the time.

81. Down on the ———.

83. Game.

85. To keep check on.

86. Cheerful tune (plural).

87. Compass direction (abbr.).

91. Very useful to birds.

93. Bird of cuckoo family.

96. Same as "6 Down" . . . we want you to remember this!

99. Location of Audubon Nature Camp (abbr.).

100. He who pays the bills.

The NATURE of THINGS

Comments on the new
Nature Literature —

By Richard H. Pough

DRIFTWOOD VALLEY

By Theodora C. Stanwell-Fletcher, Little Brown & Co., Boston, Mass., 1946. 6 x 8¾ inches, 384 pages, illustrated. \$4.00.

This is a most absorbing account of life in the wilderness of north-central British Columbia. The author and her husband, whose animal drawings illustrate the book, built a cabin and lived for two years in a virtually unexplored area. They are both naturalists and their objective was a study of the wildlife of a primitive area as yet relatively undisturbed by man. It was the sort of adventure that almost every naturalist dreams about but few are able to realize.

JOE MASON APPRENTICE TO AUDUBON

By Charlie May Simon, E. P. Dutton & Co., New York, N. Y., 1946. 5¾ x 8¼ inches, 215 pages illustrated. \$2.75.

This is a fictional account of Joseph Mason's experiences as he journeyed down the Ohio and Mississippi Rivers on a flat boat in the fall of 1820 as John J. Audubon's young apprentice. It is based on the known historical facts about this period and continues with a brief account of their association in New Orleans and Philadelphia. It is rather a pity that neither the author nor illustrator are naturalists.

WILD ACRES—A BOOK OF THE GULF COAST COUNTRY

By Henry Hazlitt Kopman, E. P. Dutton & Co., Inc., New York, N. Y., 1946. 6 x 8½ inches, 189 pages. \$3.00.

This is a series of word pictures of the typical bird habitats of the Gulf Coast and Mississippi Delta country, and their bird life through the seasons. Mr. Kopman, who has been a bird student all his life, grew up in this area and has a deep love for it. In this book he shares with others the pleasure he has had with birds on many trips afield.

THE GREAT WHITE HILLS OF NEW HAMPSHIRE

By Ernest Poole, Doubleday & Co., New York, N. Y. 1946. 6 x 8½ inches, 472 pages, illustrated. \$3.00.

Most naturalists are born rovers so regional books like this one are always of interest. This book is of more than usual interest as it contains an excellent account of the ruthless, wasteful destruction of the forests of the White Mountains and the more recent steps to restore them. Unfortunately, the author has no great interest in wild animals and his chapter on wildlife deals rather unsympathetically with the inevitable conflicts that occur from time to time between wildlife and human interests.

THE WOODLAND BOOK

By Elmer Ransom, Howell, Soskin, Publishers, Inc., New York, N. Y., 1945. 6¼ x 7¼ inches, 109 pages, illustrated. \$3.00.

Here are 17 pleasant little essays on 17 common birds and mammals. They are a combination of personal experiences in the field and sound natural history. Each is attractively illustrated with a drawing by Sabra Mallett.

ANIMAL TALES—AN ANTHOLOGY OF ANIMAL LITERATURE OF ALL COUNTRIES

Compiled by I. T. Sanderson, Alfred A. Knopf, New York, N. Y., 1946. 6½ x 9¾ inches, 310 pages, illustrated. \$5.00.

This is a collection of 32 animal stories, each a classic of its kind. Everyone has a different setting and is drawn from a different part of the world. Mr. Sanderson introduces each with a few pages of background material about the animal, the region and the author. It is all in all a very enjoyable collection, illustrated with attractive drawings by the compiler.

THE LIFE HISTORY OF AN AMERICAN NATURALIST

By Francis B. Sumner, The Jaques Cattell Press, Lancaster, Pa., 1945. 6½ x 9½ inches, 298 pages. \$3.00.

In this very frank and candid autobiography Dr. Sumner tells of his life as a biologist and teacher. Interspersed throughout are many expressions of opinion on a wide variety of subjects ranging from science and philosophy to politics. Marine biology and evolutionary problems were his main interest; and he lived and worked both in the East and the Far West.

HUNTING IN THE SOUTHWEST

By Jack O'Connor, Alfred A. Knopf, New York, N. Y., 1945. 5¾ x 8½ inches, 281 pages, illustrated. \$4.00.

This is as much a book on the game birds and mammals of the Southwest as it is a hunting book. Mr. O'Connor has a real interest in the animals themselves and in this picturesque region. Unfortunately, he has the hunter's attitude that wildlife has no right to exist except to serve man in some way and he looks forward with pleasure to the eventual extermination of the cougar.

FOOD OR FAMINE—THE CHALLENGE OF EROSION

By Ward Shepard, *The Macmillan Co., New York, N. Y., 1945.* 5½ x 8¼ inches, 225 pages, illustrated. \$3.00.

This book covers the whole field of soil erosion in the United States and tells what has been done to date to combat it. It discusses many of the yet unsolved problems and the difficulties that block a solution. About a third of the book is devoted to the often neglected problem that moving soil and water create after they leave the land and start moving down our inland waterways.

THE LAND RENEWED—THE STORY OF SOIL CONSERVATION

By William R. Van Dersal & Edward H. Graham, *Oxford University Press, New York, N. Y., 1946.* 6½ x 9¼ inches, 110 pages, 60 photographs. \$2.00.

This book by two members of the staff of the U. S. Soil Conservation Service is essentially a picture book that tells very simply and effectively through a series of photographs and the brief text that goes with each, the basic story of soil erosion and modern soil conservation.

ENOUGH AND TO SPARE

By K. F. Mather, *Harper & Brothers, New York, N. Y., 1944.* 4¾ x 7¾ inches, 186 pages, 1 map. \$2.00.

In this very provocative book Professor Mather of Harvard examines the world's over-all conservation problem. His conclusions are optimistic but based on two premises, one that the human population continues its trend toward stabilization and that man intelligently husband soil and mineral resources. In the perspective provided by this book, conservation becomes the world's greatest and most pressing problem, especially the conservation of the world's agricultural soils for which there is no known or foreseeable substitute.

LIFE OF THE OCEAN. TWELVE COLOR PLATES PAINTED FROM NATURE

By Paul A. Robert with an introduction by E. G. Boulenger and Adolf Portmann, *Oxford University Press, New York, N. Y., 1945.* 10¼ x 13½ inches, 6 pages of text, 12 color plates. \$3.00.

This set of 12 striking paintings beautifully reproduced by a Swiss firm, portrays a variety of colorful fish and other marine organisms assembled in striking groups. Although painted from living examples in the Oceanographical Museum of Monaco an effort has been made to give the impression that the animals are being observed in their wild habitat.

AT LAST!

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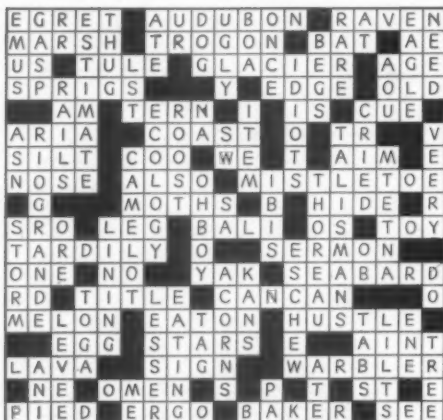
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NATUREGRAPHS

By Duart Brown, Naturegraph Company, Palo Alto, Calif., 1946. 5½ x 8½ inches, single sheets, illustrated. 5 cents each.

Naturegraphs are single sheets, each of which deals with a single species. Those on birds are headed with an outline drawing of the bird and its egg by J. Gordon Irving, Jr., with a key to its coloring and a range map. The three paragraph text covers General Description, Voice and Habits. To date, sheets have been issued on 44 birds and a butterflies, and more are planned including some on plants, mammals, amphibians and reptiles.

BIRDS

THE AUDUBON BIRD GUIDE—EASTERN LAND BIRDS

By Richard H. Pough, Doubleday & Co., New York, N. Y., 1946. 4¼ x 7¼ inches, 400 pages, 48 color plates by Don Eckelberry. \$3.00.

This book has a colored picture of each of the 275 species that it covers. Where necessary each of several different plumages is shown. There is a short foreword on birds and bird study and about a page of text on each species, giving the salient facts on their identifying characteristics, habits, voice, nest and range.

PRAIRIE WINGS

By Edgar M. Queeny, Ducks Unlimited, Inc., New York, N. Y., 1946. 9½ x 12½ inches, 256 pages, 276 photographs and 140 sketches. \$15.00.

Duck Unlimited can well be proud of this sumptuous volume, the proceeds from which are to be devoted to their work. It is essentially a book on bird flight illustrated by a wonderful collection of high speed pictures of ducks in flight taken by Mr. Queeny. The text and Richard E. Bishop's sketches explain how ducks accomplish the feats of which we know them to be capable and show that they perform many unsuspected ones in addition. The book includes briefer discussions of the techniques of bird photography, duck eyesight, duck hunting and the Grand Prairie of Arkansas, where most of the photographs were taken.

BIRDS OF THE PHILIPPINES

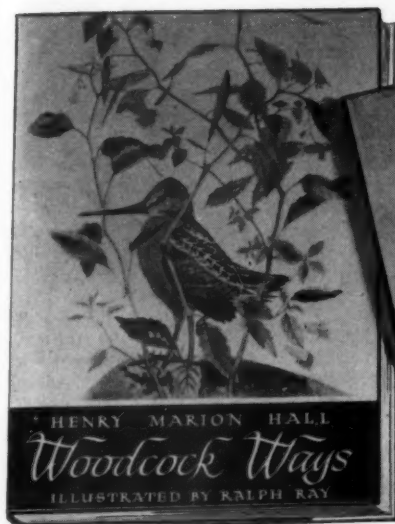
By J. Delacour and E. Mayr, The Macmillan Company, New York, N. Y., 1946. 5½ x 8½ inches, 309 pages, 169 illustrations. \$3.75.

This book following Dr. Mayr's earlier book on the birds of the islands of the Southwest Pacific now gives us good guides to the birds of the areas with which Americans are most concerned. It covers about 500 species and is arranged in systematic order with numerous keys to the species within the larger families. The excellent line drawings are scattered through the text and illustrate each of the important types that would be unfamiliar to American bird students.

MINNESOTA'S BIRDS OF PREY

By W. J. Breckenridge, Minnesota Department of Conservation, St. Paul, Minnesota, 1946. 5½ x 7½ inches, 40 pages, illustrated, paper covers. Free.

In 1945 the Minnesota legislature passed a law protecting most of the hawks and owls that occur in the state, which meant that from then on the state's department of conservation was



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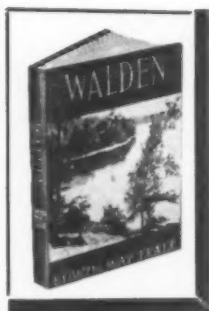
In each of these handsome volumes Henry Marion Hall writes informally and engagingly of the bird itself, the secrets of its nests and eggs, the behavior of the hen, the conditions under which the bird flourishes both in the wild and in captivity, the steps taken to preserve the species, and many other matters that only a keenly observant naturalist and skilled writer can convey.

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charged with safeguarding them. Too often conservation departments assume that they are fulfilling their entire responsibility in the matter by making an occasional arrest for the shooting of a protected hawk or owl. It is most encouraging to find a department that recognizes the fact that all the enforcement in the world will not make a law effective in accomplishing its purpose, unless it is backed by public opinion. The fine booklet that Dr. Breckenridge has produced should go a long way toward the carrying out of the legislature's mandate to the department and insuring real freedom from molestation for Minnesota's birds of prey.

WINGS AT MY WINDOW

By Ada C. Govan, *The Macmillan Company*, New York, N. Y., 1940. 5 1/4 x 7 1/2 inches, 198 pages, illustrated. \$2.50.

Any bird book that goes through 13 printings and continues to sell well after six years is in something of a class by itself. By some accident it has never been reviewed in *Audubon Magazine* and so seems worthy of comment, even at this late date. It is a simple, straightforward account of an ordinary American family's experiences with birds about their home grounds. As such, it makes a strong appeal to those who, like the Govan family, maintain a window-shelf feeding station for birds and gradually get to know many of them as individuals.

REPTILES

REPTILES OF THE PACIFIC WORLD

By Arthur Loveridge, *The Macmillan Company*, New York, N. Y., 1945. 5 1/2 x 8 1/4 inches, 259 pages, 7 line drawing plates. \$3.00.

This is another of the Pacific World Series. It covers the reptiles of the area in considerable detail and touches briefly on a few of the more outstanding amphibians. There are good chapters on snake-bite, economic exploitation and a general survey of the reptile life of the Pacific Islands. Keys are provided to the various groups and in some cases to the species. The text on each group or species is full of absorbingly interesting material on habits and life history, and is excellent reading.

REPTILES GOOD AND BAD

By W. A. Murrill, published by the author, Gainesville, Fla., 1945. 6 x 9 inches, 32 pages, paper covers. \$2.00.

This is a fairly brief and somewhat rambling discussion of the reptiles as a group. Special emphasis is given to Florida species. There are many references to other sources of information and a good bibliography is appended. This is the fifth in Dr. Murrill's series of publications on Florida natural history.

MAMMALS

THE CALIFORNIA GROUND SQUIRREL

By Jean M. Linsdale, *University of California Press, Berkeley, Calif., 1946.* 6½ x 9¾ inches, 475 pages, illustrated. \$5.00.

This book is based on 10 years of intensive study at the Hastings Natural History Reservation. It deals with the life history, ecology and behavior of the animals. The squirrel's diurnal habits make it an excellent object of study and an amazing amount has been learned about it. One of the most interesting disclosures is that this squirrel is a "weed" species on land where the normal vegetative cover has been destroyed by overgrazing or plowing. In undisturbed regions few areas are suited to it and it soon completely vanishes from most areas after human disturbance of the land is eliminated.

THE MAMMALS OF MINNESOTA

By Swanson, Surber and Roberts, *Minnesota Department of Conservation, Minneapolis, Minn., 1945.* 6 x 9 inches, 108 pages, illustrated, paper covers. Free.

The first half of this excellent booklet, known as technical bulletin No. 2, consists of a series of articles on such topics as mammal conservation, economic importance and vanished species; plus chapters on the four major groups as a group—big game, furbearers, rodents and insectivores. The systematic catalog contains a brief description and a concise statement of the animals, distribution in Minnesota, the races present and available Minnesota specimens. Many species are illustrated by photographs or drawings.

MAMMALS OF NEVADA

By E. Raymond Hall, *University of California Press, Berkeley, Calif., 1946.* 6½ x 9½ inches, 710 pages, illustrated. \$7.50.

This is a very thorough study of the mammals of a single state. It has a fine introductory section on the topography, flora, climate and life zones, other factors influencing animal distribution and a general discussion of the characteristics of the state's fauna. There is both a check-list and an illustrated key. In the detailed accounts of the species, there are range maps, skull drawings and detailed records of occurrence, as well as a general discussion of the taxonomy and habits of the animal.

PLANTS

PLANT AND PLANT SCIENCES IN LATIN AMERICA

Edited by Frans Verdoorn, *Chronica Botanica Company, Waltham, Mass., 1945.* 7 x 10½ inches, 384 pages, illustrated. \$6.00.

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To assist our readers in disposing of their surplus bird prints, back issues of BIRD-LORE and AUDUBON MAGAZINE, used cameras, binoculars, and other equipment, AUDUBON MAGAZINE will accept classified advertising from reputable individuals and business houses. Insertion will be made under the proper heading at the rate of 6 cts. per word per insertion, cash with order. Minimum insertion \$2.00. Name and address must be given as no insertion will be made with a box number. The publishers reserve the right to reject any advertisement. Address all orders to AUDUBON MAGAZINE, 1000 Fifth Ave., New York 28, N. Y.

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BIRDS OF CALIFORNIA BY DAWSON, 4 volumes, 48 color plates. Price, \$50. Audubon Octavo edition, 153 color plates (1 duplicate) in 4 loose leaf leather binders. Some damaged by fire in Audubon's home, 1845. Price, \$135.00. Gilbert, 215 S.W. Park Avenue, Portland, Ore.

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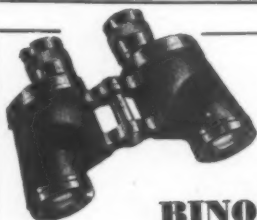
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By Lyman Benson and Robert A. Darrow, University of Arizona, 1944. 6 x 9 inches, 411 pages, illustrated, paper covers. \$3.00.

This is everything a botanical manual should be. It has a fine introduction on the ecology of the vegetation of the Southwest, an illustrated glossary, fine botanical drawings, photographs of the plants in their typical associations, beautiful color photographs of the flowers and colored range maps. The arrangement is systematic with excellent keys. Proceeding the botanical description of each species is a summary of its outstanding recognition characters. Its range of occurrence, flowering period and other peculiarities are summarized and if it is used by man or wildlife, the details are given.

FLORA OF ILLINOIS

By George N. Jones, The University Press, Notre Dame, Ind., 1945. 6¼ x 9½ inches, 317 pages, 2 maps. \$4.00.

This book is in essence a botanical key to the flora of the state. Proceeded by a family key the text is a series of keys to the genera and species in each family. The species keys including brief notes on habitat and range. A very brief introduction discusses the main vegetational divisions of the state.

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Eighteen color plates by Paul A. Robert with an introduction by Carl Schroeter, Oxford University Press, New York, N. Y., 1945. 8¼ x 11 inches, 7 pages of text, 18 color plates. \$3.00.

This set of color plates portrays 20 of the most striking alpine wild flowers in their native setting; and Dr. Schroeter's introduction gives a brief picture of the whole mountain flora of Switzerland.

BRAZIL—ORCHID OF THE TROPICS

By Mulford and Racine Foster, The Jacques Callé Press, Lancaster, Pa., 1945. 6½ x 9½ inches, 314 pages, illustrated. \$3.50.

This is an account of the Fosters' rather extensive wanderings in Brazil in search of new and interesting plants, especially airplants and orchids. In reading it one gets a good picture of the country and the people and it is full of interesting information about tropical plants. There are 137 photographs scattered through the book and some drawings.

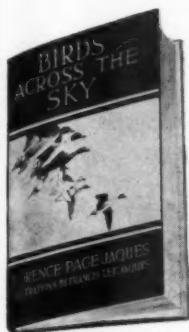
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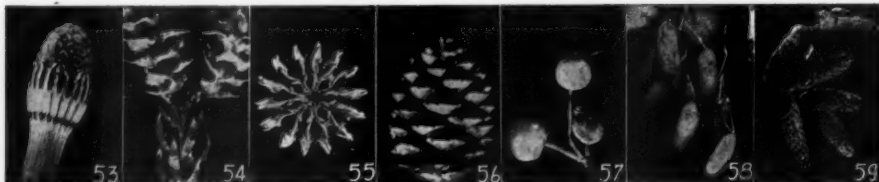
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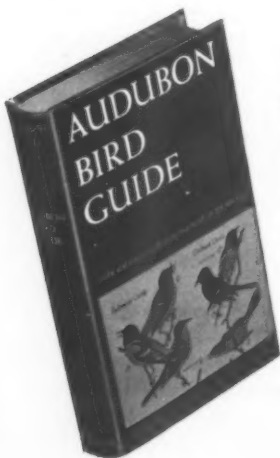
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CORRECTION

The map above, which shows breeding range of North American waterfowl, should be substituted for the one printed on page 198 of July-August number.

The July-August map shows that part of the principal breeding range that remained after the Great Drought of the early 1930s. Much of the nesting grounds then lost have been recovered, chiefly through the return of more normal rainfall. Actually, if the full breeding grounds of all species of North American ducks and geese were shown on one map, the entire United States would be shaded. This is true because the Florida duck and the wood duck nest locally over most of Florida, the latter nests in fair numbers throughout the lower Mississippi Valley, the mottled duck and fulvous tree duck nest in southern Texas and, where conditions are favorable, several species nest locally in southern Arizona and California.

The importance of this map is to illustrate the vast extent of the breeding grounds and the relatively limited area where the birds are concentrated in winter.

LETTERS

Letter from the Editor:

This issue was dummied up before the Convention was over, so there was no opportunity to report on it. You'll have to wait until next month for that.

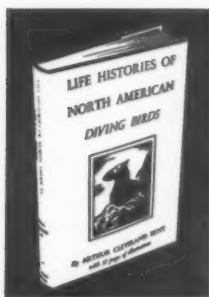
In our best ornithological manner we are trying to kill two birds with one stone in reprinting the waterfowl breeding map which you will find above. In addition to making Dr. Lincoln's corrections, we have also endeavored to give a better geography lesson in response to Miss MacDonald's letter, which is printed on the following page.

All nine provinces have now been named—Prince Edward Island, Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan, Alberta, British Columbia.

Newfoundland and Labrador (a dependency of Newfoundland) have also been named.

Thanks, Miss MacDonald, for your lesson in geography and for your interesting note about John James Audubon.

E. A. K.



Arthur Cleveland Bent's

*Life History of
North American*

DIVING BIRDS

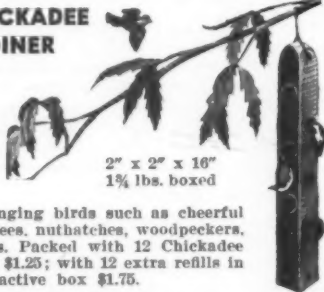
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To the Editor:

I am returning my copy of the July-August *Audubon Magazine* as I do not want to keep anything with our map of Canada so sadly misrepresented. When I looked at the map of "Breeding Grounds of North American Waterfowl" I was disgusted to find you had us marked in as the province of Quebec. I want you to know we are not part of Quebec Province. You have only six provinces marked, leaving off or shoving the Maritime Provinces into Quebec. In returned magazine I have marked in the boundary line between Quebec and the Province of New Brunswick. I have also marked the boundary line between New Brunswick and Nova Scotia. Our smallest province, Prince Edward Island, is not even drawn on your map. Newfoundland, Britain's oldest colony, is not named although drawn.

The migration is not so great from these districts as from the Canadian west, yet there is a grand migration spring and fall. In spring our land and sea birds are coming North and by the last of September the migration will be southward bound.

If you people of today know so little about us, the great John James Audubon knew and recognized our worth. In order to get material for his "Birds of America" he visited the stormy shores of Labrador and Newfoundland. Here he had wonderful success. In his return trip he stopped off to see this town, Picton—and to visit with the Rev. Dr. Thomas MacCulloch, Professor in the "old college."

If you will read "Audubon the Naturalist" by Robert Buchanan you will there see an account of Audubon's visit to this town on Aug. 22-23, 1833. Dr. MacCulloch was a minister of the Presbyterian Church, the founder of Picton Academy and a Professor there at the time of Audubon's visit. The Doctor was also a naturalist and so the two great men became the best of friends.

Many times Dr. MacCulloch got specimens of birds for Audubon. I have in my possession a letter written by the great John James Audubon to a son of Dr. MacCulloch's, and this man's nieces presented it to "MacCulloch Bird Club" of our school, when I had the club during my teaching days.

After all this, our little Scottish province by the sea is ignored! True the first settlement in 1605 was French, but we have had the name Nova Scotia. Latin for New Scotland, since 1621. We are small provinces by the sea but our great men have gone to fill positions in church and state in many lands, and our captains have sailed the seven seas.

This ignorance of our country is deplorable. Why do you not have more geography of other lands taught in your schools? When I went to school and later I taught what I had learned and among these were our Canadian provinces and capitals but we also had the states of America and their capitals as well as all other countries.

ADA S. MACDONALD

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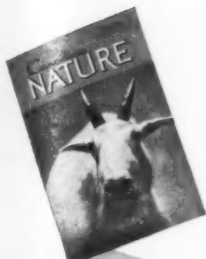
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